SEPTEMBER 25, 1923

THE RUBBER AGE

VOL. XIII. NO. 12

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THE RUBBER AGE

The Only Twice-a-Month Rubber Publication

VOL. XIII. SEPTEMBER 25, 1923 No. 12

CHEMICAL EXPOSITION HELD IN NEW YORK

Over 400 Exhibits Shown this Year—Many of Interest to Rubber Industry—Exhibits Limited to American Concerns—Next Exposition Will Be in 1925.

The Ninth National Exposition of Chemical Industries is being held at the Grand Central Palace in New York as this is being written. Over 400 exhibits comprise the chemical show this year taking in practically every phase of the chemical industry in this country. The exposition is being held during the whole of the week ending Sept. 22.

This year the Advisory Committee of the exposition decided that exhibits should include only those of American manufacturers, thus excluding a number of foreign concerns who formerly had booths. The only exception was made for Canadian manufacturers. Another announcement of interest made by the Committee was that no show would be held next year, the next exposition being in 1925. In all likelihood this two-year rule will be permanent.

It is expected that last year's attendance figures of 125,000 will be exceeded this year if the demand for tickets is any indication. It is too soon in the week, however, to obtain any authentic figures.

On Thursday night, Sept. 20, the Salesmen's Association of the American Chemical Industry held their annual banquet at the Hotel Commodore.

Of Interest to the Rubber Industry

In another column will be found the list of those exhibits of special interest and value to the rubber industry. In former years there may have been more of these exhibitors but there is no doubt that for variety and completeness this year's show far surpasses that of the last few years.

A number of prominent manufacturers appear this year who were not represented at the 1922 show, among which are Goodrich, Mohegan Tube Co., and the U. S. Industrial Alcohol Co. A few who usually have exhibits at the Chemical Exposition, as was the case last year, have not taken space this year. Booths of these last years' exhibitors will be missed in the current show. Buffalo Foundry & Machine Co., Hunter Dry Kiln Co.,

(Continued on Page 466)

E. H. Fitch

Recently Elected President of the Republic Rubber Company

Firestone Club in Washington

One hundred women supporters of H. S. Firestone recently formed the National Capital Firestone Century Club in Washington, D. C. and held an outing on Sept. 9 at the nearby Chesapeake Beach. This new club is a tribute to Mr. Firestone as a result of his deep interest in highway transportation, the proper training of boys and girls and his interest in religious activities.

The organization will be devoted to music, art, drama, literature, motoring, aviation and athletics.

The first dance to be held under the auspices of the club has been tentatively scheduled for Thanksgiving, at which time 100 Naval academy cadets at Annapolis will be invited.

The club's officers are: Miss Lorraine Bunch, selected several weeks ago by a committee of artists, as the prettiest girl in the American capital, president; Mrs. Kirby Sanford, vice president; Mrs. Edna Fulton, secretary; Miss Wilhelmina Triplett, treasurer, and Mrs. Laura Lambert, manager.

ENGLAND MAY TAX AMERICAN TIRES

Many English Tire Factories Are on Part Time and Employees are Being Supported by the Government—Tax on American Tires Proposed by Parliament

Conditions arising from a large import of American tires into Great Britain are causing much talk of an import tax on all foreign tires, according to Sir William Letts, Managing Director of the Crosley Motors, Ltd. Tire factories are said to be operating on part time and the Government is contributing to the support of unemployed rubber workers. The recent price reductions in French and American tires has further complicated the situation. No mention is made however as to whether a tax will be placed on tires imported from France, despite the fact that France exports more tires to England than does the United States.

Continuing, The New York *Times* of Aug. 24 says: "In some quarters in England a tire price war is expected. England, it is pointed out, controls the crude rubber supply of the world through ownership of rubber plantations by British corporations, and hence, it is asserted, could easily dominate the situation if that country desired to take drastic action.

The Investors Chronicle and Money Market Review of London, in connection with the position of the British tire industry, said that Sir W. Joynson-Hicks, when asked in Parliament if his attention had been drawn to the cut recently made in foreign motor types, due to depreciated exchanges, stated that "he is unable at present to advise any imposition of an ad valorem import duty." The Prime Minister, it said "further questioned whether he was aware that tire and tubes of standard sizes are being sold in England at a manufacturers' price of about 40s., whereas the cost of producing the tire here alone is 46s. 9d., stated that the whole question would receive careful consideration by the Government. Mr. Mosley pointed out that the Prime Minister during the passage of the Safeguarding of the Industries act gave a definite pledge that Part II. of the act

(Continued on Page 464)

NEW CASTLE PLANT OF SEIBERLING CLOSED

The plant of the Seiberling Rubber Co., at New Castle, Pa., was closed Aug. 31, for an indefinite period. The shut down affects several hundred men. All work is to be carried out at the Akron, Ohio, plant of the company, and it is expected that the works will reopen again about the first of the year.

F. A. Seiberling, president of the company, issued the following statement in regard to the closing: "While it is with keen regret that we find it advisable to temporarily discontinue production at our New Castle plant, the action is prompted by the desire to realize the increased economy which will result from the operation of one plant at capacity as compared to the operation of two plants at partial capacity. With large additional manufacturing facilities available at our Akron plant, it is advisable to maintain two power plants, two complete production organizations and two office forces, until such a time as these units are made productive and we are in need of further manufacturing facilities. As our headquarters are at the Akron plant and it is equipped to manufacture a greater variety of products than the New Castle plant, it is naturally the better one in which to concentrate. The outlook for the rubber industry is bright and with the enormous increase in number of automobiles, we are looking for splendid business next spring. In the two years that we have been in business a national distribution has been attained, a good will has been created extending from coast to coast, and we have established valuable export connections. Within the past two months two additional branches have been established, bringing the total to 13."

In order to take care of anticipated production demands next year the New Castle plant is to be maintained in operating condition, only such equipment as is absolutely necessary being transferred. This will consist largely of inner tube equipment, as no tubes are at present manufactured in Akron. The tire building equipment being the same for both plants, practically no transfer is necessary. A resumption of operation at the New Castle plant some time shortly after the first of the year is expected.

Mooradian Selected as Tire Expert

Harry S. Mooradian, superintendent of the Dayton Rubber Manufacturing Company, Dayton, Ohio, has been selected by the government as an expert on tire manufacturing, especially airplane tires and inner tubes and wheels.

His name has been placed on file as available as a specialist in case of a national emergency, which is in accordance with the policy of the chief of the Air Service and the assistant Secretary of War for industrial mobilization in case of need.

Mr. Mooradian was an officer in the Air Service during the war and is recognized as an authority on construction of automobile and airplane tires and tubes.

MEET MISS AKRON !

Among the many costumes which Miss Thelma Boyd took to Atlantic City, as "Miss Akron, Ohio," was one which is typical of the world's rubber center — her bathing costume. In addition to the regular suit she was equipped with a full length rubber cape with flowing ribbons and white binding, two bathing caps made entirely of rubber in fancy designs, rubber bathing slippers, rubber belt with shoulder strap and rubber garters decorated with fancy flowers, also made of rubber.

Miss Boyd, herself employed by one of the large tire manufacturers in Akron, went through the Miller factories where she picked out the rubber goods to be worn with her bathing costume.

Baker Elected Dayton Treasurer

Ellery A. Baker has been appointed treasurer of the Dayton Rubber Manufacturing Company, Dayton, Ohio, and elected to the board of directors, according to an announcement by officials of the company.

For the last twenty-five years Mr. Baker has had a wide experience in business, manufacturing and banking. He was selected by Frank Vanderlip, then president of the National City Bank of New York city, as head of the industrial service department of that bank and later became assistant vice president.

Mechanical Rubber to Operate Soon

A. E. Sidnell of Denver, former chemical engineer for the Gates Rubber Company, recently arrived in Ogden, Utah to assume his new duties as president and general manager of the Mechanical Rubber Products Corporation of Ogden, which, will shortly begin the manufacture of mechanical rubber goods.

Mr. Sidnell is optimistic over the market opportunities in the inter-mountain country. Government statistics show, he said, that Utah alone absorbs more than $10,000,000 worth of mechanical rubber goods annually. With the Ogden plant the only one of its kind between the Mississippi river and the Pacific coast, this section will provide a huge market for the output of the local plant, Mr. Sidnell believes.

Chide Canadian Manufacturers

Tire dealers in Manitoba, Canada, are protesting against Canadian rubber manufacturers' methods on the ground that they are not receiving the proper cooperation to stimulate sales. The dealers presented a resolution stating this at the Dominion convention of retail merchants at Montreal, last month. The manufacturers were requested to adopt a policy of appointing exclusive agents for tires in keeping with the size of the district served.

RUBBER PLANTS BROUGHT TO ISTHMUS OF PANAMA

Perhaps the best and most interesting collection of tropical and subtropical plants that has ever been brought to the Isthmus, according to the *Panama R. P. Star*, is the lot of 148 species that Dr. R. D. Rands, specialist in diseases of rubber plants, brought over recently from Trinidad, Curacao, and the Dutch and British Guinanas. The various entomologists at these places inspected every specimen, and they are now growing at Summit, under the care of H. Johansen, Agronomist of the Panama Canal, and here they will be carefully watched, and released for planting elsewhere only after it is certain that there is no danger from insects or diseases new to Panama.

9 Kinds of Rubber

Dr. R. D. Rands is a member of the U. S. Dept. of Agriculture Rubber Commission, and his particular specialty is the diseases of rubber plants. He has spent some years in Java and other Eastern countries studying similar problems. He brought from Trinidad and the two Guianas different kinds of rubber plants. These are the Up-river fine Para rubber (Hevea braziliensis), Castillon elastica and costaricense, Manihot glaziowii, two kinds of Balata rubber (Mimusops sp.), the rubber vine, Cryptostegia grandiflora), the Lagos silk rubber, (Funtumia elastica) and the West Africa rubber vine (Landolphia sp.) Of the Para rubber he introduced 600 seedling stumps from Trinidad, and over a peck of seeds.

Magnum Rubber To Start Operations

The Magnum Rubber Company, Passaic, N. J., has received its certificate to operate from Secretary of State Martin, and production there will start shortly. The new company acquired the plant of the defunct Smith Rubber and Tire Company. The new concern has a capitalization of 210,000 shares of stock, divided into 10,000 shares of preferred stock at $100 each and 200,000 shares of common stock with no nominal value.

Evening Merchandising Courses

The School of Retailing, Night Division, of New York University has announced a number of interesting courses among which are the following: Psychology of Salesmanship; Retail Accounting; Window Display; Mechanics of Merchandising and Presentation of Retail Policies.

The courses last fifteen weeks and start on Sept. 24. Each course lasts for two hours, one night a week.

New Tube Concerns in Kent

Another manufacturer of inner tubes has entered the industry in the Star-Diamond Rubber Co., of Kent, Ohio. Present plans call for the manufacture of tubes only, additional site being available for extension if necessary.

STANDARDIZED RIMS NOW AVAILABLE

Firestone Announces New Standardized Rims Which Simplify Wheel Rim and Tire Equipment for Trucks—Four Sizes Now Interchangeable on 6 Inch Felloe.

Another important stride in the direction of standardization in the truck industry is seen in the announcement of the Firestone Steel Products Company of a complete new line of interchangeable truck rims.

Firestone recognized that the complicated wheel and rim equipment in use today is an expensive burden upon the entire truck industry and therefore, in designing rim equipment for the 20″ truck tire, it was decided to standardize on four sizes—5″, 6″, 7″ and 8″—so as to be interchangeable on the present 6″ felloe.

The new rims, to be known as Type "B," are being manufactured for 20″ wheels in the 30 x 5″, 32 x 6″, 34 x 7″ and 36 x 8″ sizes. All four sizes will mount upon the standard 32 x 6″ wood felloe band or steel felloe, using the same clamping ring, bolts, nuts and clamps.

So satisfactory has this equipment proven, that type "B" rims are also being manufactured for 24″ wheels, in the 34 x 5″, 36 x 6″, 38 x ″7 and 40 x 8″ sizes, all of which fit the 36 x 6″ wood felloe or steel felloe, using the same clamping ring, bolts, nuts and clamps.

Other Improvements Included

Instead of the inside flange being integral with the rim base, type "B" rims have been made with two removable side rings, facilitating removal of the tire by applying pressure from either side and permitting in case of injury, the replacement of the ring only, instead of the complete rim as is now necessary. A high carbon, spring locking ring has been provided, which holds the tire securely and insures firm seating. The drive plates are of a heavy type to withstand extreme circumferential strains.

It is claimed that this standardized type "B" rim equipment will simplify the wheel needs of the truck manufacturer to a maximum of two types, one light and one heavy, both using the standard 6″ felloe. This will permit the mounting of 5″, 6″, 7″ or 8″ rims, according to the tire requirements of each particular truck model.

Also, it is said, that general use of this interchangeable rim equipment on pneumatic tired trucks will enable wheel manufacturers to standardize their production in volume runs, thus reducing costs and bettering service to truck manufacturers, dealers and owners.

With type "B" rims, the truck owner need carry but one spare, despite the fact that he may be using two sizes of tires, such as 36 x 6″ front and 40 x 8″ rear. These standardized rims make one spare fully interchangeable on both front and rear wheels. This enables the truck operator to use the spare on any wheel in emergencies.

Discharging Latex from a Steamship

The above photograph shows a recent shipment of rubber latex being discharged from the steamship *West Mahomet* in New York harbor. This shipment of 90,000 gallons, the largest ever made, was consigned to The United States Rubber Company for distribution to its factories. Thirteen tank cars were required for its transport.

Tuscora Reorganization Plans

The first step toward actually reorganizing the Tuscora Rubber Co., Canton, Ohio, was taken recently when officials mailed a circular letter to each stockholder, explaining the refinancing plan, which is based upon bonds secured by first and second mortgages on the plant.

A new company to take over the plant will not be formed until the entire bond issue, totaling $300,000 has been sold. Two new Philadelphia banks have agreed to buy $75,000 worth of the bonds.

New Tube Concerns Begins Operations

The Core-Lock Tube Co., at Washington Court House, Ohio, completed its first inner tube on Aug. 22. The temporary quarters of this company are at 209-13 East Market St. The work marked the beginning of the new company's activities there, although it will be two or three months before modern equipment is installed and the manufacture of the new self-sealing tubes are started on a large scale.

The new tube, while it can be punctured, according to the manufacturers, will not leak after being puctured, and owing to its peculiar construction the puncture is closed automatically and vulcanizes itself. It is claimed to be the first tube on the market that really does this, and as a result it is expected the demand will be enormous.

It is the intention of the company to proceed with the work of making the tubes with what equipment is available until modern equipment can be obtained. The starting capacity of the plant under present arrangements, will be 3500 tubes each day, and this will be increased as the demand grows. Orders for more than 200,000 of the tubes have already been booked, it was recently announced.

MALONE RUBBER COMPANY RECENTLY REORGANIZED

The following officers were elected at a recent meeting of the Malone Rubber Company, held in the office of the plant at Malone, N. Y.: President, L. F. Lehr; vice president, William L. Allen; secretary, Allen H. Frost; treasurer, Hiland Estabrook.

The following are directors of the newly reorganized company: L. F. Lehr, William L. Allen, Hiland Estabrook, Charles Fenalson, William A. Emphall, C. H. Dupree, John B. Hinds, J. Lyman Kelly and Douglas Callander of Malone; M. R. Reynolds of Burke, Ernest Cunningham of Brushton, Dr. W. A. Wardner of St. Regis Falls, W. Keefe of Fort Covington, Fred Roberts of Little Falls.

The election of officers was the final step in the matter of reorganization, which has been in progress for several months under the direction of a reorganization committee which was appointed to represent the interests in the North American Process Co., Inc., the original company to equip and operate the plant. The Malone Rubber Company, which is incorporated under the laws of the State of New York, filed its papers on Aug. 13, 1923, starting business with a capital of $100,000. The building and equipment of the North American Process were acquired by the Malone Rubber Company at a receivers' sale held last May. The company will manufacture rubber goods, specializing in giant size automobile tubes.

Scrip Dividends Buy Tires

Tires may now be purchased with scrip is the recent ruling of The Mason Tire and Rubber Co. Kent, Ohio. The company has been paying dividends in scrip, and any stockholder may now go to a dealer selling Mason tires and purchase tires with scrip.

AMERICAN RUBBER MEN REPORTED SAFE IN JAPAN

All of the American rubber men and their families known to have been in Japan at the time of the recent disaster have been reported safe.

Mr. and Mrs. G. A. Ludington, Vice-President of Fisk were reported unharmed though the Canadian Pacific Steamship "Empress of Australia," on which they were at the time, was damaged in Yokohama harbor.

Similarly Mr. and Mrs. F. R. Carroll, Goodrich representative, Mr. and Mrs. Heber Collier, Superintendent of Goodrich Yokohama factory, Mr. and Mrs. H. G. Miller, Firestone representative in Tokyo and Yokohama and R. W. Hadley and family, Goodyear representative were reported safe. The Carrolls and Colliers are now bound for the United States, it is reported.

England May Tax Tires

(Continued from Page 461)

was not to be applied against French goods.

"An American firm of raw rubber dealers, in a series of graphs regarding the rubber industry, show that the world's export of tires is now distributed as follows: France 40 per cent., United States 25 per cent., England 12 per cent., Italy 7 per cent., Germany 5 per cent., and others 11 per cent. These percentages are based on money values converted apparently at the ruling rate of exchange.

"Colonel Sealy Clarke, Chairman of the British Rubber Tire Manufacturer's Association, at a meeting held to consider the serious situation arising through a French competitor making a 10 per cent. cut in tire prices, stated that since 1920 not one of our British tire and rubber factories had been fully employed, and in December last one in every eight of their 65,000 employes was drawing unemployment dole, apart from the large number on short time. Colonel Clarke stated that one of the results of the heavy depreciation in French currency is that every pound paid in wages in the tire-making industry in France secures as much labor as would be secured by £3 in England, and that this has enabled France to obtain a firm hold on foreign tire markets. He emphasized that many tire users in this country do not know that Michelin is a French tire, the Continental is German, that Goodyear and Goodrich are American, Pirelli Italian, Hutchison French; Dominion, Firestone and Miller all three American."

Zinc Oxide Plant Enlarged

The Anaconda Company, Bettes Corners, Akron, Ohio recently announced that it would increase its plant to one and one-half times its present size at a cost of over $500,000. Construction will begin at once so that the new plant may be in operation before the end of this year. Zinc Oxide will be manufactured exclusively at this plant.

MOHAWK AND STAR DECIDE NOT TO MERGE

The directors of Star and Mohawk who have been considering a plan to consolidate the two companies have decided that such a merger would not be to the best interests of the companies and therefore all negotiations toward this end have been terminated.

GOODYEAR HELPS BUILD NAVY AIRSHIP ZR-1

Goodyear Contract Called for Air Cells Made of Goldbeater's Skin from over 600,000 Steers—Aeronautical Experts of Company Aid in Installation of Cells.

In the interest aroused all over the country in the recent launching of the new Navy airship, ZR-1 and its more recent trip of 12 hours over New York, Philadelphia and parts of New Jersey, sight has been lost of the fact that the rubber industry played an important part in its construction.

The air cells of the ZR-1 were built and lined with goldbeater's skin by The Goodyear Tire & Rubber Co., on a contract begun early in 1921 and completed almost a year ago. Goldbeater's skin comes from the big intestines of steers. It took more than 600,000 steers to furnish this material for the navy's aerial masterpiece.

Goodyear aeronautical experts also handled the installation of the cells as it was nearing structural completion. The cells are 36 in number, eighteen being used and eighteen spares held in reserve.

The contract was handled under the supervision of V. N. Braden, aero manager, with J. T. Cooper, balloon room foreman directly in charge. Lieut. George V. Whittle, was in charge of the navy inspection bureau at Goodyear during the work of construction.

Firestone Reduces Prices

Reductions in dealers' prices of Ford size tires and tubes were announced on Sept. 13 by The Firestone Tire and Rubber Company. The cuts range from 10 to 15 per cent. The dealers' price on 30 x 3½ fabric tires was reduced from $10.25 to $8.90, but if purchased in lots of a dozen or more the price is $8.40. Reductions on other grades were on the same basis. Prices of other sizes of tubes and tires and other products remain unchanged.

Hunneman Receives Degree

Roger D. Hunneman, who was with the Hood Rubber Co. from 1919 to 1921, received the degree of Master of Science in Chemical Engineering Practice from the Massachusetts Institute of Technology in June, 1923, and is now connected with the research laboratory of the Standard Oil Co. at Whiting, Indiana.

RECEIVERS APPOINTED FOR NEW YORK RUBBER COMPANY

The N. Y. Rubber Co., with offices at 291 Broadway, N. Y., and a plant at Beacon, N. Y., manufacturer of belting, hose and packing for over 50 years, was placed in the hands of equity receivers on Aug. 31, on account of a lack of sufficient ready cash to meet current demands.

The bill in equity asking that receivers be appointed was filed by Stotesbury & Miner, 110 William street, solicitors for A. D. Juilliard & Co., the complainant.

The defendant corporation, by John Acken, President, consented to the receivership, and Judge Bondy named James G. Meyer and George W. Retz receivers with joint bond of $50,000, with authority to continue the business. The bill gives the assets of the defendant as $1,003,160, with liabilities of $225,849.

The bill alleges the defendant has an outstanding stock issue of $497,000; that it has a plant, machinery, real estate, etc., at Beacon worth $688,843; has accounts receivable worth $93,926, stock and raw materials on hand worth $169,995, and other assets of $50,000.

The liabilities consist of outstanding notes, $123,474; accounts payable, $100,-032, and accrued debts, $2,342. The bill alleges that the defendant lacks ready funds with which to meet pressing obligations, but is solvent.

In estimating the assets, the bill declares, no account has been taken of the good will of the defendant. This is alleged to be very valuable as the defendant corporation has been continuously engaged in the manufacture of mechanical rubber goods for more than fifty years.

The bill alleges that approximately two-thirds of the assets of the defendant are tied up in real estate, machinery and raw materials and that it is in need of ready money with which to meet current obligations.

Officers of the company are as follows: President, John Acken; Vice-President, E. S. Woodward; Secretary, W. G. Sprague.

U. S. Meets Firestone Reduction

Following closely on the heels of the announcement of Firestone that Ford size tires have been reduced, the U. S. Tire Company announces a cut varying from 12½ to 22½% to the dealer. This decrease is for both fabric and cord tires.

So far no other manufacturers have announced similar cuts but it is hardly expected that other tire makers will allow it to be a "private fight" with the result that a general reduction is expected soon.

Scrap Rubber Dealers Meet

The National Association of Waste Material Dealers will hold its quarterly meeting at Drake Hotel, Chicago, on Sept. 25-26. The Scrap Rubber Division will meet on Wednesday, the 26th, at 10 A. M.

KLEINERT NOW SETTLED IN COMMODIOUS QUARTERS

After being in business for more than 40 years the I. B. Kleinert Company are now thoroughly settled in their new and commodious quarters at 41st Street and Fifth Avenue, New York City. The Kleinert organization left its old quarters on Broadway and Waverly Place in June — after having been there for about 27 years — with many regrets and sorrowful partings, because old friends and old associations meant much to it.

The company's new quarters, however, are not only pleasing from an artistic point of view, but should be a sales producer also, because the offices are thoroughly equipped and so arranged that no time is lost in obtaining articles that a prospective buyer may desire. The paneled ceilings are decorated with replicas of Florentine designs, while the salesroom has attractive counter and window displays and desks at the side specially designed for the convenience of both the customer and the salesman. All told, the company occupies about 20,000 square feet of office space in the heart of New York's business section.

The Kleinert company began business in 1882, manufacturing ear muffs. Since then they have developed a large business in rubber shields for women, rubber sheeting, Jiffy baby pants, sanitary rubber aprons for women, while their most recent addition is their line of rubber powder puff pockets.

Almost 30 years ago the second plant was erected and in order to meet the demand of its expanding business the Kleinert concern has built nine additional plants in College Point, New York, the latest addition being built in 1922. The company has always interested itself in all the particulars concerning rubber products, especially the chemistry of rubber and the handling of it.

Kleinert's Factory Buildings at College Point

BALLOON TIRES IN FRANCE ANNOUNCED BY MICHELIN

It is reported that the Michelin Company will exhibit balloon tires at the Automobile Show in Paris next month, according to *Motor World*. This move on the part of Michelin comes as a distinct surprise to the tire industry both here and abroad as it was not known generally that experiments were being conducted.

The first announcement to the French trade of this tire was made about the middle of August. The tire is called by the maker a "comfort tire" and is especially designed for small, light cars.

The new tires, according to the same source, are clincher bead cord construction designed to replace the 700 by 80, 710 by 90 and 765 by 90 tires used on such cars as the small Citroen, 7 hp. Renault, the small Mathis, Amilcar, Salmson, Peugeot and other popular models with engines of 67 in. or less.

Instead of the normal section of 80 or 90 mm., the new tires appear to be of 130 mm. section, and instead of the normal 50 to 60 pounds pressure they are inflated only 18 to 20 pounds pressure.

Makers who have tried out these tires on their cars are enthusiastic regarding them and have already given orders for their show models to be equipped with "comfort tires." Michelin states that he has no intention of confining himself to the present sizes, but has begun at this end of the scale because the necessity for big low-pressure tires is much more pronounced on cars weighing 800 pounds than on those of 2000 pounds.

British I. R. I. 1923-24 Plans

The Institute of the Rubber Industry, London has just announced its program of papers for the 1923-24 sessions. The papers to be read at the London meetings are: Sept. 17, 1923, *Rubber Floors and Rubber Roadways*, by Evan J. Edwards; Oct. 1, *Plantation Life from a Tropical Point of View*, by Cyril Baxendale; Nov. 5, *Salesmanship* by A. H. Williams; Dec. 3, *Accelerators*, by Major V. Lefebure; Jan. 7, 1924, *Consistency of Rubber and Rubber Compounds*, by Dr. Sam S. Pickles; Feb. 4, *The Use of Rubber Latex in the Manufcture of Boards, Leather and Linoleum Substitutes and as to the Vulcanization of these Products*, by Frederick Kaye; March 3, *Life and Work of Thomas Hancock*, by Herbert Rogers and B. D. Porritt; April 7, *Solid Tires*, by W. Bond; May 5, *The Rubber Industry—A Plea for Closer Working*, by James Fairbairn.

The following papers will be read at the Manchester meetings: Oct. 15, 1923, *Rubber Machinery*, by H. C. Young; Nov. 19, *Costing in the Rubber Industry as an Essential Factor to Successful Production*, by C. A. Fryer; Dec. 7, Joint Meeting with the Society of Chemical Industry. Paper: *The Analysis of Rubber Vulcanizing Accelerators*, by T. Callan, the Institute being represented by B. D. Porritt; March 17, 1924, *Selling Rubber Goods*, by Capt. E. E. Buckleton. The subject for the Jan. 21st meeting has not yet been fixed. It is proposed to have an American Night on Feb. 18.

Only one paper has been arranged for at the Birmingham meeting on Oct. 19, 1923, *The Vulcanization Process from its Inception to the Present Day*, by B. D. W. Luff. Papers for the February and March, 1924 meetings have not yet been arranged for. The meeting for the Edinburgh section is now in course of arrangement.

Death of J. H. Olmstead

John H. Olmstead, a retired rubber importer in New York, died recently at Doylestown, Pa., in his seventy-third year.

Eliminating Waste in Tire Industry

Definite progress in the movement to eliminate waste in industry is being made in a number of important lines, according to a bulletin just issued by the Fabricated Production Department of the Chamber of Commerce of the United States.

The bulletin states that "industry is no longer thinking of simplification and standardization as activities which may stifle initiative or interfere with service to the trade. No confusion can result if it is kept clearly in mind that the objective is the elimination of waste which is today obstructing industrial progress."

Wider recognition of standards for certain automotive accessories and component parts was the keynote of a meeting held on March 9, 1923. Automobile manufacturers, accessory producers, service men, engineers, and users were in attendance. A very representative committee was selected to make a survey of existing conditions and to bring about the adoption of established standards and development of additional standards for many of the non-competitive parts and attachments. Initial efforts are to be directed toward roller bearings, spark plugs, tires and storage batteries.

CHEMICAL EXPOSITION HELD IN NEW YORK

(Continued from Page 461)

Klipstein, New York Rubber Co., and Roessler & Hasslacher Co.

Radio, of course, is well represented this year by exhibits of radio panels and other parts by the Luzerne Rubber Co., and the American Hard Rubber Co., in addition to their regular line of hard rubber goods.

A complete list of exhibits of interest to the rubber industry follows:

B. F. Goodrich Co., *Akron, Ohio.*—showing a complete line of rubber goods used in the chemical industry including exhibits of the following: footwear, hard rubber tubing, battery jars, hard rubber sheets and jars, their special acid resisting hard rubber sheet, "Olivite," rubber lined tanks, cutless bearing and sealing rings, hose, belting and packing, rag rugs, etc. In addition they are showing photos of belting installations and acid and tank cars. A chart gives a list of accelerators that Goodrich is making for the rubber industry. Booth 564. In charge, L. H. Chenoweth, Akron, and F. E. Wood, New York.

General Electric Co., *Schenectady, N. Y.*—In addition to a complete line of motors, instruments, etc., this company is showing a line of hot welding and heating devices and a heat treating furnace for annealing tools, metal, etc. Booth 3-4.

National Rosin Oil & Size Co., *New York City.*—Showing burgandy pitch and rosin oil for the rubber trade. Booth 39. In charge, R. Bender.

Magnesia Talc Co., and Southern Mineral Corp., *Waterbury, Vt.*—Tale and silica respectively. Booth 273. In charge, R. B. Ladoo, H. A. Macbeth and J. H. Burleigh.

Mohegan Tube Co., *Brooklyn, N. Y.*—Welded and non-corrosive tubing for inner tube mandrels. Booth 277.

Sturtevant Mill Co., *Boston, Mass.*—Grinders and pulverizers for reclaiming processes. Equipment used at a number of the larger rubber plants in Akron and in New England. Booth 30-31. In charge, L. N. Doyle, Western Sales Manager.

Johns-Manville Co., Inc., *New York City.*—Insulation and lining for drying rooms. Insulation for vulcanizers and for general heat retaining purposes. Packing and gaskets in which rubber is a component part. Booth 48. In charge, H. Reinhardt.

Union Sulphur Co., *New York City.*—Flowers of sulphur, refined and roll sulphur. Booth 25.

Morse Chain Co., *New York and Ithaca, New York.*—Showed Morse chain drives used in mill and calender drives in sizes up to 24″ for 75-100 H. P. mills and in the 2″ size for individual chain drives for 3-5 H. P. tire building machinery. Booth 539. In charge, D. I. Wheeler, Cleveland Office and F. G. Anderson, New York.

New York Thermometer Co., *New York City.*—Hydrometers and chemical thermometers for use in chemical laboratories. Booth 548. In charge, W. Freed.

Exhibits of Interest To Rubber Industry

Abbe Engineering Co., *N. Y. City*
American Hard Rubber Co. *N. Y. City*
American Schaeffer & Budenberg Corp., *Brooklyn*
Anaconda Copper Mining Co. *Perth Amboy, N. J.*
Bakelite Corp., *N. Y. City*
The Bristol Co., *Waterbury, Conn.*
Brown Instrument Co. *Philadelphia, Pa.*
Cooper Hewitt Electric Co. *Hoboken, N. J.*
Carrier Engineering Corp. *Newark, N. J.*
J. P. Devine Co., *Buffalo, N. Y.*
The Dow Co., *Louisville, Ky.*
Eimer and Amend. *N. Y. City*
General Electric Co. *Schenectady, N. Y.*
The B. F. Goodrich Co., *Akron, Ohio*
Industrial Chemical Co., *N. Y. City*
Johns-Manville, Inc., *N. Y. City*
Luzerne Rubber Co., *Trenton, N. J.*
Morse Chain Co., *N. Y. City*
Magnesia Talc Co., *Waterbury, Vt.*
Mohegan Tube Co., *Brooklyn*
National Rosin Oil & Size Co. *N. Y. City*
New Jersey Zinc Co., *N. Y. City*
New York Thermometer Co. *N. Y. City*
Pfaudler Co., *Rochester, N. Y.*
Smith & Serrell, *Newark, N. J.*
B. F. Sturtevant Co., Inc., *Boston, Mass.*
Sturtevant Mill Co., *Boston, Mass.*
Swenson Evaporator Co., *Chicago*
C. J. Tagliabue Mfg. Co., *Brooklyn*
Uehling Instrument Co. *Paterson, N. J.*
U. S. Industrial Alcohol Co. *N. Y. City*
U. S. Industrial Chemical Co. *N. Y. City*
Union Sulphur Co., *N. Y. City*
United Metals Selling Co., *N. Y. City*
Westinghouse Elc. & Mfg. Co. *E. Pittsburgh, Pa.*
Whiting Corp., *Harvey, Ill.*

Mehling Instrument Co., *Paterson, N. J.*—Are showing CO_2 recorders for use in power houses as installed in several rubber plants. Booth 45. In charge, F. F. Mehling and E. C. Phelps.

U. S. Industrial Chemical Co., & U. S. Industrial Alcohol Co., *N. Y. City.*—Are showing solvents as absolute alcohol, ethyl acetate, amyl acetate, ester and U.S.I.—U.S.P. alcohol, Webb's Pure Alcohol, Pyro and alcorub. Booths 326, 327, 330, 331. In charge B. R. Tunison.

Dow Co., *Louisville, Ky.*—The exhibit consists of a miniature conveying system in operation. The system includes a roller gravity conveyor, a roller spiral, a belt conveyor, and an inclined slat conveyor, is continuous and handles the packages automatically throughout the cycle. Booths 529 and 530. In charge of Messrs. Harry Dunning and W. J. Lueckel, New York office.

The Luzerne Rubber Co., *Trenton, N. J.*—Are exhibiting hard rubber products, standard and special, especially those parts which are used in the chemical industries, such as hard rubber pipe, fittings, buckets, valves, tanks, etc. for the handling of corrosive solutions. In addition a line of hard rubber radio parts and hard rubber closet seats, were shown. Booths 308, 309.

Swenson Evaporator Co., *Chicago, Ill.*—Swenson-Walker Continuous Crystallizer, together with a model of the Yaryan Film Evaporator, and photographs, catalogs, drawings, etc., illustrating their complete line of equipment. Booth 78. In charge, F. M. DeBeers, Gen. Mgr.; P. B. Sadtler, Chem. Engr.; Prof. W. L. Badger, Geo. T. Walker, and C. E. Brown, of Philadelphia.

Abbe Engineering Co., *N. Y. City.*—Exhibiting at booth numbers 76 and 92 a complete line of the following: Jar Mills, Pebble Mills, Laboratory Mills, Ball Mills, Max Mills, Rotary Cutters and Mixers. The Rotary Cutter and mixing machinery of interest to the rubber industry. In charge, H. C. Russ, H. F. Kleinfeldt, C. A. Beach, R. Foster, A. T. Beach, Jr. and E. Beach.

Industrial Chemical Company, *New York*—Whiting and Gas Black. This Company has been selling the Rubber Trade for over twelve years. They are distributing a Transit Map of greater New York which greatly assisted visitors (as well as natives) in and about the City. Booth 90. In charge, J. Wrench, C. H. Dickinson, and R. Renouf.

Eimer & Amend, *N. Y. City*—Exhibit includes the following: "MCA" Standard Apparatus according to the Manufacturing Chemists Association Standards, The MacMichael Viscosimeter, Wysor Polishing & Grinding Machine, Juerst Ebulliometer, Bader Colorimeter, Mathieson Bleach Tester, Hortvet Cryoscope, Hortvet Sublimator, Bausch & Lomb, and Spencer Miscroscopes, Barnstead Stills, Freas Automatically Controlled, Electrically Heated Ovens, Multiple Replaceable Unit Furnace and Hot Plate, U. S. Navy Emulsifier, Braun Crusher, Gramercy Reagent Bottles, Edgar Purdom Rapid Electrolysis Cell, Fleming Combustion Bulb, Fisher Absorption Bottle, Bingham & Green Plasometer, Menzies & Wright Ebulliometer, E & A Standard Analytical Balance, E & A Standard Student's Balance. Booth 58. In charge, E. P. Churchill, F. W. Schulenberger, R. S. Chalfont, T. M. Saulters, J. T. Little, A. O. Eimer and G. Heinz.

Smith & Serrell, *Newark, N J.*—Exhibit shows the FRANCKE flexible couplings, PINTITE rigid couplings and KEYTITE self-fitting keys. Booth 252.

C. J. Tagliabue Mfg. Co., *Brooklyn*—The exhibit consists of the following representative products: TAG Perfect Pressure Controller, which automatically maintains a desired pressure; TAG Simplex Pressure Controller, a smaller brother of the Perfect which maintains pressure within very close limits; TAG Recording

(Continued on Page 482)

EARNINGS COMPARISON OF RUBBER COMPANIES

Earnings of Companies Show a Gain over 1921—Six Months' Statements Reflect Slower Turnover However and Result of Upset of Tire Trade is Shown

From an operating standpoint the semi-annual statements recently issued by four of the large rubber companies—United States, Goodyear, Goodrich and Fisk — show considerable improvement over the same period of 1922. In each case, production and sales were substantially greater and there was a corresponding gain in earnings.

Goodrich showed the largest gain in sales with an increase of $15,000,000; United States was next with $13,700,000; Fisk third with $6,400,000 and Goodyear fourth with $4,000,000. In net profits gain, however, Goodyear leads with $3,400,000; Goodrich is second with $1,700,000; United States third with $1,400,000 and Fisk fourth with $1,300,000.

The apparent discrepancy is due to difference in the methods employed by the several companies in charging out costs of raw materials. Some companies use an equalized cost based on possible replacement values, while others use current cost for materials consumed. All companies entered the year with large quantities of rubber on hand or contracted for at prices considerably below the current market price. In view of the rapid rise in crude rubber those companies using an equalized price for the six months have not entered the second half of the year under a handicap which may make an unfavorable comparison of earnings between the two periods.

Operating Factors

The following table compares various operating factors with the same period in 1922:

		Net sales	Profits before interest	Net for stock
United States				
	1923	$87,710,205	$7,743,346	$4,572,861
	1922	73,933,771	6,305,113	3,052,918
Increase		$13,776,434	$1,438,233	$1,519,943
Goodrich	1923	54,074,926	4,509,815	3,006,385
	1922	39,143,392	2,839,164	1,312,000
Increase		$14,931,534	$1,670,651	$1,694,385
Goodyear	1923	55,439,631	8,967,079	5,693,926
	1922	51,410,240	5,501,793	1,915,890
Increase		$4,029,391	$3,465,286	$3,778,036
Fisk	1923	29,167,850	3,010,377	*1,704,209
	1922	22,692,856	1,774,024	1,111,191
Increase		$6,474,994	$1,236,353	$593,018

*After appropriating additional reserve of $500,000 for contingencies.

Recent Recessions

The greater part of the improvement above noted was made in the first three or four months of the year. General trade recession and lower volume were felt in the second quarter but are more clearly reflected in the financial condition of the several companies than in earnings. Following the price reductions in May, the market for tires became stagnant, resulting in slower turnover of inventories which together with the increased costs and higher prices for raw materials brought about the increase in borrowings and consequent diminution of net working capital.

Tire Outlook Better

The following table compares these balance sheet items with 1922:

		Working Capital	Inventories	Bank Loans
United States				
	1923	$79,870,000	$84,227,000	$38,425,000
	1922	86,393,000	75,993,000	34,990,000
	Inc.	‡$6,523,000	$8,234,000	$3,435,000
Goodrich				
	1923	$36,213,667	$30,326,131	$13,073,357
	1922	46,401,673	24,145,626	*.....
	Inc.	‡$10,188,006	$6,180,505	.....
Goodyear				
	1923	$51,849,127	$37,003,779	†.....
	1922	59,287,592	32,756,653	†.....
	Inc.	‡$7,438,465	$4,247,126	.....
Fisk	1923	$20,127,573	$16,840,777	$7,885,000
	1922	23,302,703	13,131,529	7,045,000
	Inc.	‡$3,175,130	$3,709,248	$840,000

‡Decrease.
*Goodrich had $30,000,000 of notes outstanding which were refunded by bond issue last year.
†Goodyear had no bank loans, as new financing took care of requirements.

There has been some improvement in the tire situation during recent weeks. Although recent price cuts and curtailment of production will tend to reduce ratio of profits in the last half of the year, it is expected that larger sales, because of increasing automobile consumption, will result in a rapid decrease in inventories and improvement of financial conditions toward the end of the year. Other branches of the industry, such as footwear and mechanical goods business, continue on a profitable basis. Industry as a whole for 1923 should show marked improvement over 1922, particularly with those companies not entirely dependent on tire business. (*Wall Street Journal*, Aug. 20, 1923).

Seiberling's "Ask 'Em To Buy" Campaign

In order to stimulate sales of tires and tubes in the normally slow month of September, the Seiberling Rubber Company is urging its dealers to use every means possible to close sales during that month with all prospects. In order to help the dealer in this compaign the advertising department of Seiberling has sent each of its dealers reprints of its trade and general magazine advertising for use as window displays. In addition the dealer has received a large placard on which is given a number of hints for the dealer to follow.

It is expected that every dealer will be on the phone, out on the street, in the homes and offices clinching all sales that are pending in the hope of making September a 'clean-up' month.

Excel Showing is Satisfactory

Receiver F. L. Lytle of the Excel Rubber Co., Wadsworth, Ohio, reports favorably on the condition of the plant and states that large quantities of belts are being made and sold. The taxes have been paid from the proceeds and all supplies are being bought for cash. Mr. Lytle as receiver has had charge during the past five months.

MILLER MARKETING NEW 30 x 3½ CLINCHER CORD

A new 30 x 3½ Clincher Cord tire selling at fabric prices has just been announced by The Miller Rubber Company, Akron, Ohio.

This new cord has the regular Geared-to-the-Road flat tread which gives approximately 38% more road contact, increased traction, cuts down road wear and eliminates side skid. The flat top

New Miller Cord Tire

construction throws the hinging point to the sidewall, practically eliminating disintegration of the carcass. There is a rib at the edge of the tread which adds strength and durability. There is a smooth running strip in the center of the tread to which the beveled gears are affixed.

The carcass embodies all of the features and qualities of the Miller Geared-to-the Road products—breaker strip, cushion, friction, workmanship, and inspection. The carcass is non-spliced. The air bag cure process is employed in this cord as in all other Miller tires. This assures stronger unity between the plies of the carcass, between the cushion and the carcass, between the breaker and the tread and assures uniform tension in the cure.

The uniformity of construction is obtained by alternating the arrangement of cords to permit each cord to lie in its proper position and results in equal distribution of strength. The entire carcass thus allows each cord and each ply to carry an equal load, and eliminates premature breakage of any one ply.

Canadian Rubber Association Moves

The office of the Rubber Association of Canada has been moved from the Royal Bank Building to 707 Reford Building, Bay and Wellington Streets, Toronto, Ontario. A. B. Hannay is Secretary.

RECENT IMPORT DUTIES LEVIED ON RUBBER GOODS

The Azores and Madeira Islands

Imports from Portugal are admitted duty free.

Imports from the United States are subject to the minimum rates of duty. The conventional rates (plus the surtax) apply to imports from countries having most-favored-nation status with Portugal, and when no conventional rate is given the minimum rate applies. Among the countries having most-favored-nation status are the United Kingdom, France, Germany, Italy, Spain, and Belgium. Certain elastic corsets and rubber tires and tubes are the only rubber manufactures having conventional rates.

The gold escudo is equivalent to $1.08. On May 3, the paper escudo was quoted at $0.0437. Import duties for the maximum and minimum rates are paid in gold. Conventional rates are payable in paper, but the surtax (which is applicable only to conventional rates) is paid in gold. All weights are net weight. Kilo equals 2.2046 pounds avoirdupois. The following schedule became effective April 20, 1923.

Tariff No.	Articles.	Maximum Escudos per kilo.	Minimum Escudos per kilo.	Conventional Rate & Surtax Escudos per kilo.	Escudos per kilo.
	Rubber and the like:				
54	Raw	0.01	0.005	...	...
55	Prepared	0.02	0.01	...	...
423	Packing, stopping and cords of any vegetable fibre, yarn, fabric or trimming, with rubber or asbestos, or impregnated with other substances, with or without a metallic nucleus	0.10	0.07	...	...
	Corsets, stays and belts for women:				
424	Of silk, pure or mixed, with or without rubber	(each) 4.50	(each) 3.00	(each) ...	(each) ...
425	Of net (other than silk), with or without rubber	1.70	1.10	...	...
426	Of fabrics not elsewhere specified, with rubber	1.50	1.00	...	...
	Corsets of hosiery fabrics or cotton, linen or hemp, or of cotton, linen or hemp fabrics with rubber or gutta percha	...	...	2.00	0.80
	Fabrics in which rubber is incorporated by any process, whether or not the fabric predominates:	(per kilo)	(per kilo)	(per kilo)	(per kilo)
447	Of pure or mixed silk	3.00	2.00	...	...
448	Of wool, pure or mixed (except with silk)	1.00	0.50	...	...
449	Of cotton, linen or the like	0.60	0.30	...	...
	Fabrics in bands or strips (*tiras*)				
450	Of cotton, linen and the like impregnated with rubber or other materials, for electrical insulation	0.15	0.10	...	...
451	Of cotton, linen and the like with rubber superimposed, up to 10 cm. wide	0.015	0.01	...	...
549	Transmission belting of any material	0.045	0.03	...	...
595	Solid rubber tires with or without iron rim, for motor trucks and similar vehicles	0.10	0.05	...	...
608	Inner tubes and outer covers of rubber, with or without textile fabric, for vehicle wheels, and strips of rubber glued on cloth for repairing	0.40	0.20	0.05	0.18
	Rubber and the like:				
640	Thread	0.08	0.04	...	...
641	Tubes, even strengthened with threads or wire of any kind, fabrics or trimmings	0.06	0.03	...	...
642	Manufactures, not elsewhere specified	0.80	0.40	...	...
769	Buttons, not elsewhere specified	1.00	0.50	...	...
770	Toys and games, except billiard tables and accessories therefor	0.80	0.40	...	...
	Footwear (boots and shoes):				
775	Not elsewhere specified	0.50	0.25	...	...
777	Mats and matting of any substance	0.16	0.08	...	...

Honduras

The import duties apply equally to the products of all countries.

Duties are paid half in United States and half in Honduran currency, at current rate of exchange. Peso is equivalent to $0.5076 at par. There is a surtax of 5% of duty (paid in gold) and a sanitation tax of 0.005 peso per gross kilo levied on all imports. Kilo = 2.2046 pounds avoirdupois.

Tariff No.	Articles.	Rate of Duty. (Pesos per ½ gross kilo.)
	AUTOMOBILES AND SUPPLIES (INCLUDING TIRES) ARE ADMITTED FREE OF DUTY.	
360	Bicycles, motor cycles and their accessories (including tires)	0.25
677	Machine belting of rubber	0.02
1173	Machine belting: of cloth, rubber or leather	0.02
1701	Hose of cotton cloth, tarred or not, of linen cloth, rubber or oilcloth	0.15
2507	Tubes: of rubber (hose)	0.15
1046	Machine packing of rubber, asbestos or other kinds	0.02
410	Boots of rubber	1.50
514	Footwear of rubber	0.50
2613	Slippers, shoes and galoshes, of rubber	0.50
1035	Shoe elastics: of cotton	0.25
1036	Shoe elastics: of silk	0.50
1037	Shoe elastics: of wool	0.25
730	Tapes: of cotton, elastic, other than those for footwear	0.40
731	Tapes: of wool, linen or hemp, with or without elastic	0.50
733	Tapes: of silk, with elastic	1.50
2332	Rubber dress shields	0.50
1614	Garters: of cotton or other vegetable material	0.75
1615	Garters: of cotton, with embroideries	1.00
1616	Garters: of wool or linen	1.00
1617	Garters: of wool or linen, with embroideries	1.50
1618	Garters: of pure or mixed silk	3.50
2463	Suspenders: of cotton, wool or leather	1.00
2464	Suspenders: of silk	3.50
2950	Abdominal belts	0.50
426	Trusses	0.30
293	Billiard cushions of rubber	0.50
385	Rubber balls	1.00
408	Rubber erasers	0.30
931	Cord: of rubber or elastic gum, for catapults and other purposes	0.50
1021	Douches or irrigators, with or without parts of glass or rubber	0.25
1038	Elastic bands for papers, etc.	0.30
1195	Game counters: of rubber	0.30
1443	Thread: of rubber	0.50
1506	Vases: of rubber, celluloid or composition	0.15
1515	Syringes: of rubber or gutta-percha	0.30
1518	Jewelry: of rubber or gutta-percha	0.30
1532	Toys: of rubber or gutta-percha	0.30
1628	Foot wipers: of rubber	0.30
2029	Nipples of rubber for nursing bottles	0.30
2222	Rules of any form, of common metal, wood, rubber or composition with or without metal edges	0.30
2298	Life-preservers of rubber, waterproof fabric or cork	0.30
2391	Stoppers: of gum or rubber	0.30
2407	Rubberized cloth or oilcloth for floors	0.15
2418	Fabrics: rubbered for table covers	0.20
2447	Tubs: of rubber for bathing	0.30
3006	Irrigators	0.30

Costa Rica

The import duties apply equally to the products of all countries.

Colon equals $0.465 at normal exchange. Kilo equals 2.2046 pounds avoirdupois. Duties are payable in paper at the rate of 4.30 colones to one dollar. Imports through Limon pay a surtax of 5% of duty; other ports 2%. There are certain other minor customs charges.

Item No.	Articles.	Colones per Gross Kilo
ex43	Elastics, of cotton, for shoes	3.00
ex44	Elastics, of cotton, for suspenders, garters, and similar articles	4.00
ex56	Elastics, of wool, for shoes	5.00
ex57	Elastics, of silk, for shoes; elastic bands of wool for other uses than for shoes	8.00
ex59	Elastics, of pure silk or of silk in combination with other materials, for suspenders, garters, and similar articles	11.00
ex71	Crude rubber; rubber belting for machinery	0.12
ex73	Packing of rubber for machinery; rubber hose	0.20
ex74	Carriage wheels with rubber tires; rubber tires for carriages, automobiles, and other vehicles, and solutions or cement for repairing same; crude rubber for tires; tiling of rubber or gum for floors	0.40
ex77	Rubber, gutta-percha, cork, celluloid, and gums, in sheets or plates for industrial uses; rubber and cork manufactured into mats and similar articles	0.80
ex80	Rubber or rubberized raincoats, of cotton fabrics	1.20
ex83	Rubber or rubberized raincoats, in combination with gutta-percha or cork, of wool or wool and cotton fabric, and leggings, shoes, boots, sponges, hats, caps, receptacles, and soles for footwear; rubber stamps and letters; toys of all kinds, made of rubber	2.00
ex83	Rubber, gutta-percha, cork and gum manufactured into sheets, mattresses, life-savers, cushions, nipples, syringes, bottles, stoppers, capsules, tubes, and in all other forms, not for adornment	2.00
ex85	Hard rubber, cork, and gums manufactured into articles of adornment, of less than 2 kilos in weight; rubberized silk capes and raincoats; rubber heels not combined with other material	4.00
ex99	Footwear of canvas with rubber soles	6.00
ex135	Surgical bandages, elastic stockings, and other surgical apparatus, not otherwise specified	2.00

Plauson Colloid Mill

By W. J. Kelly

The Goodyear Tire & Rubber Co., Akron, Ohio

DURING the past two or three years considerable interest has been aroused in this country and Europe in the Plauson colloid mill. Several articles have appeared in the literature giving descriptions of the mill itself and speculations as to what might be expected of it, as well as some experimental data on products obtained from it. Practically nothing has been written on the power-consumption capacity or efficiency of the mill, and up to the present time very little is known on these phases of the operation of the machine. The attempt will be made in this article to clear up some of these points.

Description of the Mill

The Plauson mill is what might be called a beater mill. Referring to the sketch, the beaters are shown at *B* and the baffles or anvi's, as Plauson prefers to call them, at *A*. *H* is the housing, *I*, *I'* are inlets or charging ports, and *O* is the outlet. *S* is a sight glass. The front and back of the housing are jacketed so that the mill may be either cooled or heated as occasion may require. The beaters revolve at high speed, and in the case of the turbine-driven mill attain 12,000-14,000 r.p.m., giving a peripheral speed of about 37,000 to 44,000 feet per minute.

Three theories have been advanced for the action of the mill. The first is that the blow delivered between the anvils and the beaters on the film of liquid is transmitted to all the particles in the suspension in that part of the mill, and if the force of the blow is great enough the particle is shattered. The second theory is that a shearing action takes place as the beaters pass between the anvils. The velocity gradient here is very high—viz., from zero on the anvil to the speed of the beater—and the clearance is only about 1 mm., hence, a big shearing action is possible. The third theory is less plausible than the others, and in this one it is assumed that at the instant of impact there is an instantaneous superheating of the liquid causing more or less of an explosion in the particle when the pressure is removed. This theory is based on the fact that the temperature of any liquid beaten in the mill rises very rapidly and water may be boiled in a few minutes.

Operation

As the mill is used at present for grinding solid materials, it is an intermittent machine. The charge usually consists of about 1 kg. of solid and 4 liters of liquid, and the mixture is subjected to the action of the beaters for about 10 minutes, after which the charge is removed through the outlet *O* and a new one put in. This operation can be modified by circulating a large batch, but the results are not usually so good as when the single small charge is employed, since there is no way of being sure that the whole of the batch as it is being circulated passes between the beaters and the anvils.

For use as an emulsifier the 3000-r.p.m. mill is being used successfully, and for this type of work it can be made to work continuously up to the capacity of the feeding and receiving tanks. It has a capacity of about 1.5 to 1.7 tons of water per hour when used in this manner. Better results are obtained if the mixture of the liquids is passed twice through the mill, or even through two mills in series.

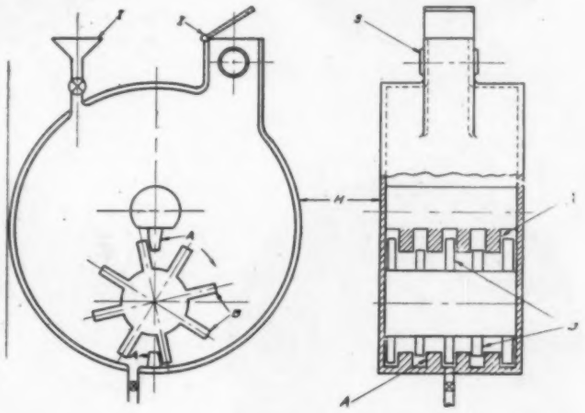
Power Consumption

No figures are available for the power consumption on the turbine-driven mill. However, there are some on the motor-driven, 3000-r.p.m. mill, of which the following will serve to give some idea of the power required to drive the mill.

Running empty the mill requires 5 kw. With a charge of 1000 grams solid material and 4000 cc. water, the power consumed varies between 15.5 and 19.3 kw. The viscosity of the charge will change these figures and if the charge is reduced to one-half, the power consumed is about 10 to 12 kw. For emulsifying liquids less power is required, probably about 13 to 15 kw., and hence for 1.5 tons of liquid per hour the consumption would be about 4 to 5 watt-hours per pound.

Grinding Solids

For grinding solids the size of particle obtained depends on the ease with which the substance may be fractured and on the speed of the mill. Hence, for a given speed the size



Action of the Mill

of the particle will vary from substance to substance and the uniformity of the product will depend on the length of time it is beaten. There are very few data available on the actual particle size of materials which have been ground in the Plauson mill. However, in most cases the substances show a very decided Brownian movement when viewed in a microscope equipped with a dark, ground illuminator. Naturally, not all the particles show this movement, but a large percentage are of a size small enough to exhibit this phenomenon. At the same time, only a very small percentage, if any, of materials such as barytes, zinc oxide, lithopone, clay, etc., can be ground to the degree of fineness possessed by gas black. Von Hahn[1] has published some figures on the size of particles obtained in different gas blacks, but the figures given for the "American Gas Black" are obviously very far from the truth. This is because of the dispersion medium, 49 per cent alcohol, which will not disperse gas black, and hence all von Hahn's results were obtained on a sample which was badly agglomerated. The particles in ordinary American gas black are all less than 0.2 μ. However, the Plauson mill will grind most materials to a degree of fineness unattainable by other grinding machines. The claim is made that all materials can be reduced to a colloidal size in the mill, but the term colloidal is rather too elastic for the definition of particle size.

"Dispersators"

It is claimed by Plauson that the addition of certain substances in very small amounts will aid the grinding to a very marked degree. These substances are called "dispersators." In addition, a certain amount of a protective colloid, such as gelatin, gum arabic, lysalbinic, protalbinic acids, etc., is added. The function of the "dispersator" is to put an electric charge on the particle. It is well known that very

From *Industrial & Engineering Chemistry*, Sept. 1923

[1] *Kolloid Z.*, 31, 96 (1922).

small amounts of electrolytes are necessary to make a stable sol, and the "dispersator" is usually an electrolyte, such as sodium hydroxide, ammonia, etc., depending on the nature of the substance being ground. In some cases acids might just as well be used.

The photomicrographs show very well the effect of the by increasing the interfacial area, and hence it is claimed by Plauson that many reactions which take place only very slowly or not at all can be made to go very rapidly in the colloid mill. One such reaction is the saponification of fats to make soap and this reaction is complete within 5 or 10 minutes when the alkali oil and water are beaten together

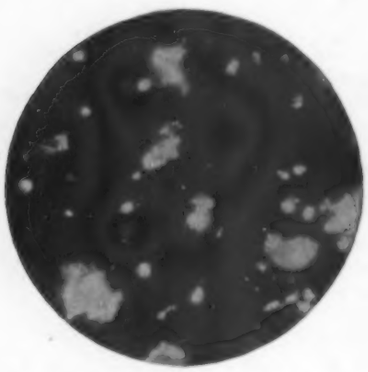


Fig. 1—Original China Clay. 270 X

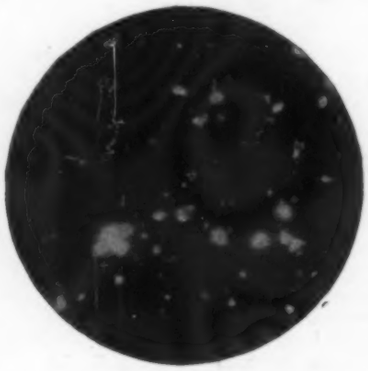


Fig. 2—China Clay Ground in 3000-*R. p. M. Mill* 270 X

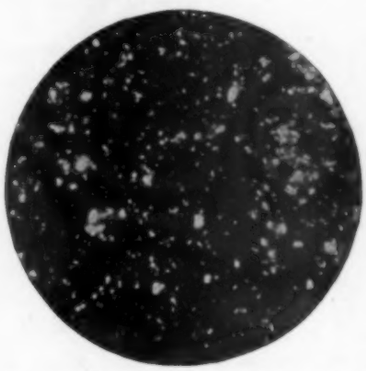


Fig. 3—China Clay Ground in 12,000-*R. p. M. Mill. No Dispersator or Protective Colloid.* 270 X

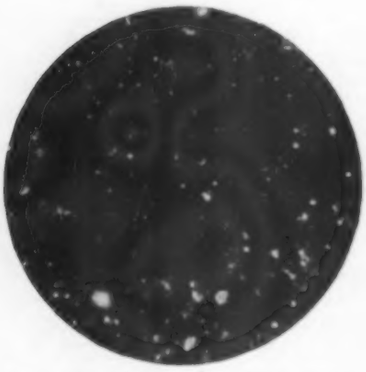


Fig. 4—China Clay Ground in 12,000-*R. p. M. Mill with Dispersator and Protective Colloid.* 270 X

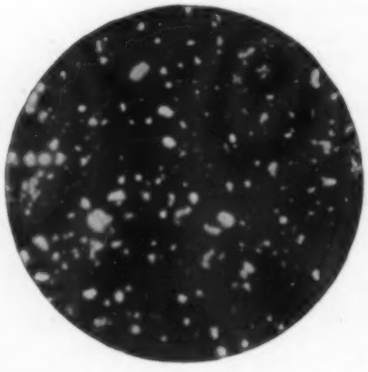


Fig. 5—Original Zinc Oxide. 405 X

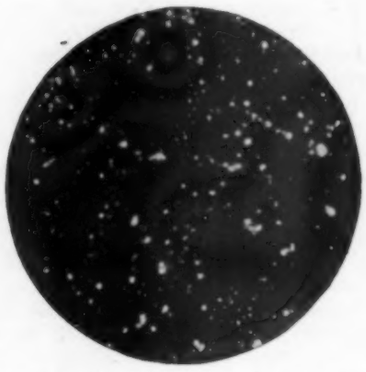


Fig. 6—Zinc Oxide Ground in 12,000-*R. p. M. Mill.* 405 X

grinding both with and without the dispersators. Fig. 1 is the original china clay which was used and Fig. 5 is the original zinc oxide. Fig. 2 shows the china clay after being subjected to the action of the 3000-r.p.m. mill for 10 minutes in the presence of a small amount of alkali as dispersator and gum arabic as a protective colloid. It will be seen that although the material is somewhat reduced in size the reduction is not very great. Fig. 3 shows the same material ground in the 12,000-r.p.m. mill without the use of dispersator or protective colloid. In order to obtain a comparative dispersion of the two clay samples both dispersator and protective colloid were added and stirred in *after* the sample was ground. Fig. 4 shows the same material ground with the dispersator and the protective colloid. A comparison of these two photomicrographs will show that the 12,000-r.p.m. mill has a decided effect in reducing the size of the clay particle, but that this size is independent of the presence of the dispersator or the protective colloid. With substances of a different nature and also of a small size originally the effect of the mill is not nearly so great. This can be seen from a comparison of Figs. 5 and 6, which show original zinc oxide and the same material after grinding in the 12,000-r.p.m. mill. The effect of the mill is clearly visible in each figure.

Chemical Reactions

Chemical reactions taking place between phases of heterogeneous system can be made to proceed more rapidly in the 3000-r.p.m. mill. No external heating is necessary and the process might be made to give a continuous flow of soap from the mill. The time of reaction may be even less than 5 minutes, but it does take place in that time. The esterification of cellulose by acetic acid may also be accelerated by carrying it out in the Plauson mill after the cellulose has been reduced in size from the fiber to something considerably smaller. It is also possible that resins and gums could be dispersed in water or other media in which they are insoluble by passing them through the mill after adding sufficient solvent to soften them and thus change the action of the mill from that of grinding a solid to that of emulsifying two liquids.

There are many places where the mill can be used in the chemical industry provided the cost of driving it is not excessive for the product. It has two main disadvantages at present—first, the power required to operate it, and, second, its small capacity. It is quite possible that its capacity and efficiency may be increased to the point where the cost per unit of material obtained will put the mill on a plane where it can be used commercially. There is a great deal of development work to be done, but this will probably be done best by the different industries themselves, as they are better acquainted with their own problems than any outside firm could possibly be. It is up to the individual firm to decide whether or not it will pay to develop it to meet the conditions under which it will have to operate.

Rubber and Balata Belting Exports

American Belting Growing in Popularity
British Product Slightly Higher in Cost

By H. G. Holt

Assistant Chief, Rubber Division, Department of Commerce

THE trade in rubber and balata belting has increased steadily since 1921, reflecting increased industrial and mining activity throughout the world. At present, United States manufacturers are the leading suppliers to foreign importers, with the United Kingdom a close second. While the volume of American exports exceeds that of British exports, the British product sells at a much higher price in world markets, which may account for the growing popularity of the American lines. The exports of rubber and balata belting from the principal manufacturing countries in 1922 totalled approximately 7,000,000 lbs., and had a value of about $4,500,000.

During 1922, the United States supplied approximately 37 per cent by volume of the total world export trade in rubber and balata belting; the United Kingdom secured about 34 per cent; and France with 12 per cent, Germany 9 per cent, Canada 5 per cent and Norway 2 per cent accounted for most of the remainder.

Fluctuations in British Export Trade in Belting

The United Kingdom is easily the most formidable rival of the United States in this branch of export trade. The exports of "belting other than leather, woven hair and cotton," under which title shipments of rubber and balata belting are classified in British trade statistics, amounted to 40,446 cwt. valued at £1,227,273 in 1919; 44,762 cwts. valued at £1,387,661 in 1920; 16,885 cwts. valued at £452,159 in 1921 and 211,170 cwts. valued at £445,289 in 1922. From these figures it is evident that the price trend for British exports has been steadily downward during the past four years, and owing to the strong position held by British exporters in world markets, export prices for rubber belting generally have followed the same trend. The volume of the British trade has fluctuated greatly; exports during 1922 were 25 per cent heavier than in 1921, but less than 50 per cent as heavy as the 1919-1920 average. The value per cwt. of exports during 1922 was 22 per cent lower than in 1921.

Detailed statistics of exports of rubber belting from the United Kingdom are not yet available for 1922, but the following tables show the destination of exports during 1919, 1920, and 1921. The trade with British Possessions continued at a much better rate during the latter year than the trade with foreign countries, perhaps because of the preferential treatment accorded to British products. Europe took a preponderant share of 1919-1920 exports, but the industrial distress experienced in every European market during 1921 reduced the trade considerably, this tendency being further accentuated by the recovery of local manufacturers of rubber belting in many European countries. It is fairly certain that British exports contain a larger percentage of balata belting than of rubber; in the United States the opposite is the case and this may in a measure account for the lower price of the American product.

British Trade Increasing This Year

During the first 6 months of 1923, the British exports amounted to 12,395 cwts. valued at £248,579, as compared with 9,282 cwts. valued at £205,546 in the corresponding period of 1922, a volume increase of over 33 per cent. At 112 lbs. per cwt., these 1923 exports amount to 1,388,240 lbs., as compared with 1,749,505 lbs. exported from the United States in the same period. Some of the leading British manufacturers of rubber and balata belting are the India Rubber, Gutta Percha, and Telegraph Works Co., Ltd.; R. & J. Dick, Ltd.; North British Rubber Co., Ltd.; Greengate and Irwell Rubber Co., Ltd., The Leyland and Birmingham Rubber Co., Ltd.; John Tullis and Son, Ltd., and George Angus and Co., Ltd.

Export Markets Take 11 Per Cent of American Production

According to the 1921 census, 18 American establishments were reported to be engaged in the manufacture of rubber belting and hose as their principal products, the total production of these plants being valued at $14,880,277. Many of the leading tire companies also produce rubber belting as a secondary line, and the total value of the belting production alone for the year was $13,068,798. The value of United States rubber belting exports in 1921 was $1,446,063; in other words, the American manufacturers are dependent on foreign markets for over 11 per cent of their sales.

United States exports of rubber belting during 1922 had a total value of $1,268,235, a decrease of 12.3 per cent from the 1921 value. Since the British trade statistics indicate that export prices for belting were about 22 per cent lower in 1922 than in 1921, it is probable that on a quantity basis, American 1922 exports were slightly in excess of 1921. The quantity shipped in 1922 was 2,585,334 pounds as compared with 2,371,040 pounds for the United Kingdom in the same

EXPORTS OF RUBBER AND BALATA BELTING FROM UNITED KINGDOM

COUNTRIES TO WHICH CONSIGNED	1919 cwts.	1920 cwts.	1921 cwts.	1919 £	1920 £	1921 £
Russia	3,296	2,547	84	101,661	82,060	2,493
Finland	—	—	362	—	—	9,268
Sweden	2,648	4,034	304	76,312	120,079	8,795
Norway	1,003	659	91	28,481	20,936	1,604
Denmark (Inc. Faroe Is.)	3,979	2,655	547	110,263	76,836	12,187
Germany	186	1,099	374	6,007	34,570	11,836
Netherlands	1,135	1,737	310	42,996	51,837	8,693
Belgium	5,120	1,197	662	155,640	35,337	16,870
France	7,276	5,450	3,307	215,472	155,151	67,673
Portugal	361	361	290	11,301	11,569	7,920
Spain	341	1,202	132	11,519	40,287	3,859
Italy	1,186	1,194	321	37,971	37,871	8,466
Rumania	248	359	243	8,927	12,186	6,178
China (exc. of Hong Kong, Maco & leased ters.)	213	844	139	6,900	29,384	3,113
Japan (inc. Formosa & Japan leased ters. in China)	679	1,094	343	17,738	32,722	9,813
United States	716	1,501	216	16,095	34,103	5,306
Mexico	75	192	110	2,710	6,303	3,376
Chile	465	582	205	15,023	17,834	4,851
Brazil	1,003	1,474	437	33,435	51,554	13,573
Argentine Rpublic	1,246	1,876	1,019	41,249	58,639	29,265
Other Foreign Countries	1,536	1,763	904	49,199	61,204	26,128
TOTAL TO FOREIGN COUNTRIES	32,711	31,520	10,400	988,899	970,462	261,266
Cape of Good Hope	244	470	197	7,883	14,740	5,948
Natal	746	609	550	22,591	18,785	15,447
Transvaal	1,384	1,598	1,012	44,799	55,155	30,506
British India, via Bombay (inc. Karachi)	206	336	172	6,338	11,841	5,050
Madras	96	154	124	2,656	5,496	3,515
Bengal, Assam, Bihar & Orissa	274	1,319	323	7,756	38,979	8,782
Burmah	655	1,109	637	18,559	37,302	20,014
Straits Set. & Dependencies (inc. Labuan)	241	597	207	7,258	17,919	6,648
Australia	1,053	2,011	941	32,463	60,335	24,848
New Zealand	996	1,512	925	31,471	48,488	25,903
Canada	678	1,821	412	20,261	59,768	12,057
Other British Possessions	1,162	1,426	985	36,339	50,393	32,175
Total to British Possessions	7,735	12,962	6,485	238,374	417,199	190,693
TOTAL	40,446	44,782	16,685	1,227,273	1,387,661	452,159
TOTAL (1922)		Cwt. 21,170		Valued at		£455,289

year. While the American trade is now greater in volume than the British, the value of the British trade is considerably above that of the United States. During the latter part of 1922, American rubber belting exports began to increase notably, and the tendency continues this year, 1,749,505 pounds having been exported during the first six months of 1923, an increase of over 84 per cent as compared with the 949,651 pounds exported in the first half of 1922. The destination of the American exports may be secured from the Rubber Division upon request for copies of Statement 2091 for 1922 and the first half of 1923.

Comparison of British and American Exports

In view of the leading positions occupied by the United States and the United Kingdom in the rubber belting trade a comparison of their exports during the past 18 months is given below. The much higher value per pound of British belting exports is shown in separate column, the conversion of the pound sterling being at the monthly average rate quoted in The Federal Reserve Bulletin. It may be noted that during 1922, the monthly shipments from the United Kingdom frequently exceeded those from the United States; beginning with October 1922, the American exports have exceeded the British regularly. Monthly exports from Canada are likewise shown together with value per pound, and German exports are shown by quantity. The last column shows the combined exports from these countries by months and indicates how steadily the trade has grown during the past year. Stated in quarterly periods, the number of pounds of rubber belting exported from these four countries has increased as follows: first quarter, 1922, 1,088,006 lbs.; second quarter, 1,290,181 lbs.; third quarter 1,664,941 lbs.; fourth quarter 1,887,730 lbs.; first quarter, 1923, 1,761,724 lbs. As the belting trade is a fair index of the turning of the wheels of industry, these trade statistics give evidence of a generally improved condition in industrial plants and mines throughout the world.

RUBBER BELTING EXPORTS FROM CERTAIN COUNTRIES

	UNITED STATES		UNITED KINGDOM		CANADA		GERMANY	
1922	*Pounds*	*$ per lb.*	*Pounds*	*$ per lb.*	*Pounds*	*$ per lb.*	*Pounds*	*Total*
Jan.	151,006	0.53	121,520	0.85	26,805	0.54	38,360	337,691
Feb.	135,736	0.56	147,728	0.92	20,289	0.52	29,321	333,074
March	174,803	0.48	166,544	0.88	26,952	0.54	48,942	417,241
April	133,198	0.52	200,816	0.85	9,737	0.62	44,312	388,063
May	206,843	0.43	209,104	0.89	5,541	0.63	39,903	461,391
June	148,065	0.56	193,872	0.92	50,289	0.47	48,501	440,727
July	247,428	0.47	187,264	0.93	48,398	0.41	69,004	552,094
Aug.	212,462	0.50	247,744	0.76	27,388	0.52	59,965	547,559
Sept.	232,025	0.48	260,512	0.78	18,738	0.38	54,013	565,288
Oct.	289,771	0.51	192,180	0.83	17,396	0.49	66,359	565,706
Nov.	356,445	0.45	256,368	0.75	42,132	0.44	85,979	740,924
Dec.	297,552	0.49	187,488	0.82	26,977	0.43	59,083	571,100
1923								
Jan.	309,921	0.49	224,336	0.84	23,378	0.45	64,154	621,789
Feb.	217,984	0.53	175,616	0.77	26,658	0.55	44,753	465,011
Mar.	333,497	0.50	246,624	0.84	67,025	0.59	27,773	674,924
April	230,305	0.58	193,984	0.80	12,950	0.41	118,166	555,405
May	385,175	0.55	288,400	0.85	55,547	0.43	—	—
June	272,623	0.59	259,280	0.80	—	—	—	—

Exports of French Mechanical Rubber Goods Declining Steadily

French trade statistics do not show exports of rubber belting separately, the returns being combined with rubber hose, washers and packing. A comparison of the totals for the past three years shows that French mechanical rubber goods have steadily lost ground in export markets. In 1920, the gross weight of these exports was 2,114.4 metric tons; in 1921, 1,701.3 metric tons; and in 1922, 1,316.4 metric tons. During the first four months of 1923, 444.2 metric tons were exported as compared with 581.2 metric tons in the corresponding period of 1922. In 1920, the net weight of exports was 1797.2 metric tons, 15 per cent lower than the gross weight. We would estimate that not over one third of the total French exports of mechanical rubber goods would consist of rubber belting, which would make the proportion of the world export trade in this product enjoyed by France in 1922 approximately 12 per cent. Detailed statistics of the destinations of exports are not yet available for years subsequent to 1920, when exports to Great Britain, Belgium, Switzerland and Algeria constituted over 60 per cent of the total.

Germany Supplied 9 Per Cent of Rubber Belting Exports in 1922

Germany did not regain any important share of the world trade during 1919, and even in 1920 the greater part of her production of rubber belting was used locally. In 1921, the German manufacturers began to extend their foreign sales and in 1922 rubber belting was exported to the amount of 643,743 pounds, about 9 per cent of the total world export trade that year. Over 56 per cent of the 292 metric tons shipped went to European markets, the Baltic States taking 49.5 metric tons, North Russia 37.5, Finland 27.8, Austria 23.3, Denmark 19.6, Czechoslovakia 4.9, and Netherlands 3.4 metric tons; the total exports to other countries amounted to 126 metric tons. Whether German exports will continue to expand is somewhat problematical; during the first 4 months of 1923 the total amount of exports was 115.6 metric tons as compared with 73 metric tons in the corresponding period of 1922.

Rapid Growth of Exports from Canada

Canadian exports of rubber belting, while relatively small, amounting in the calendar year 1922 to 320,642 pounds or less than 5 per cent of the total world export trade, show an extremely steady and rapid growth during recent years, Canadian trade statistics are for fiscal years ended March 31; for the year ended March 1920, rubber belting exports amounted to 29,902 lbs. valued at $24,455; 1921, 99,359 pounds, valued at $83,869; 1922, 106,746 pounds valued at $56,197; 1923, 363,657 pounds valued at $177,304. The downward price trend, commented upon in connection with the exports from the United Kingdom, may be noted here, the price per pound decreasing from 84 cents in 1920-21 to 52.6 cents in 1921-22 and to 48.7 cents in 1922-23. From the following table of exports it may be noted that an increasing trade is enjoyed particularly with British South Africa, and New Zealand, where preferential tariffs give Canadian manufacturers some advantage. The increasing volume of trade with "other countries' indicates a rapid sales expansion in world markets generally. Practically no balata belting is manufactured in Canada.

CANADIAN EXPORTS OF RUBBER BELTING

	Years Ended March 31					
	1921	1922	1923	1921	1922	1923
	Lbs.	*Lbs.*	*Lbs.*	*$*	*$*	*$*
United Kingdom	—	—	3,900	—	—	1,372
United States	10,303	615	5,530	7,755	455	1,583
Australia	38,904	27,300	42,566	37,706	17,721	24,543
British South Africa	13,543	35,631	62,419	7,925	15,917	28,644
Newfoundland	17,581	2,877	11,746	14,806	1,311	4,430
New Zealand	14,615	13,433	65,350	11,537	8,549	36,840
Other Countries	4,413	26,890	172,144	4,140	12,244	79,892
	99,359	106,746	363,657	83,869	56,197	177,304

Balata Belting Exported from Norway

There is a fairly well developed balata belting industry in Norway, and the product is said to be of excellent quality. Even in prewar years the exports were fairly important, amounting to 172 metric tons in 1913, and 119 in 1914. Since the close of the war the quantity exported has been less than 75 metric tons annually except in 1920 when it reached 101 metric tons. Expressed in pounds, the exports in recent years have been: 1919, 96,944 lbs.; 1920, 223,258 lbs.; 1921, 81,600 lbs.; and 1922, 159,435 lbs. While the Norwegian industry is unlikely to compete on a large scale in world markets, it is a factor to be reckoned with in the Scandinavian trade. Two of the leading Norwegian belting manufacturers have factories to Christiania. During 1922, the belting exports from Norway supplied about 2 per cent of the total world export trade.

The exports of rubber belting from other rubber manufacturing countries are relatively insignificant. During 1922, Italy exported about 30,000 pounds of rubber belting; and Austria exported 26,000 pounds as compared with 59,000 pounds in 1921. In the fiscal year ended June 1921, Australian exports of composition belting were valued at £2,493, the weight probably being less than 15,000 pounds.

Uses of Rubber and Balata Belting

Rubber and balata belting are being used both for power transmission and for conveying purposes. Such belting is especially suitable for power transmission in plants where acids, acid fumes, and moisture lead to the rapid deterioration of other belting, the coating on the belt serving as a protection to the enclosed fabric. The first cost of rubber and balata belting is lower than of leather belting. The conveyor belts are used to a large extent for conveying purposes in mines, and especially in chemical industries, acid works, dye houses, bleacheries, ammonia works, tanneries, breweries, etc. Rubberized elevator belting is suitable for use in a wide range of industries.

Rubber Formolite *

This short article gives some of the interesting properties of rubber formolite. This substance is not used to any great extent in the rubber industry at the present time, but it presents possibilities which make it an interesting rubber product.

By Dr. F. Kirchhof

RUBBER reacts with formaldehyde to form what is known as rubber formolite. Experiments were conducted to determine the conditions of this reaction, the rapidity and completeness with which it took place during an investigation to explain the constitution of the decomposition products that are obtained from different sorts of rubber by subjecting them to the action of sulphuric acid.

The formolite, that is obtained by the reaction of rubber with formaldehyde with a considerable increase in weight, is very similar to the formolite that is obtained from other cylic unsaturated hydrocarbons. In the preparation of formolite one gram of plantation rubber (light crepe) was caused to swell up in one hundred cubic centimeters of light benzine (petroleum ether). Then 2.5 cubic centimeters of concentrated sulphuric acid are added and the rubber solution is shaken up with the acid until complete solution of the swollen rubber is effected. Then an additional 2.5 cubic centimeters of concentrated sulphuric acid are added and thoroughly mixed with the solution and allowed to stand for some time. Rubber then is precipitated in the form of yellow, amorphous flakes. This is a decomposition product of rubber.

The yellow color of the rubber is due to decomposition products derived from the benzine solvent. A small amount of these subsances are formed due to the action of the sulphuric acid. At this point 2.5 cubic centimeters of formaldehyde are added (40 per cent solution). The liquid and the rubber product are agitated thoroughly and after a certain period of time had elapsed a greenish brown, thickly flocculent precipitate was formed. Then the reaction mass was heated for one hour on a boiling water bath, whereupon the product assumed a more brownish coloration.

After cooling the supernatant liquor was poured off, the precipitate was washed with hot water several times. Each time the precipitate was washed it was vigorously squeezed in a mortar with a pestle or other suitable instrument. The brown, crumbly product was covered with a strong ammonia solution, whereupon its color was converted into a golden brown and after it had been triturated still further and washed with cold water almost all of the acid was removed from it. At this point the crumbly substance was squeezed together into one mass and dried in a drying oven at a temperature of 95 degrees C until it assumed a constant weight. The following results were obtained from this experiment.

Experimental Results

One gram of rubber gave 2.005 grams of crude formolite in one case and in another case 2.192 grams of formolite. The crude formolite was refined and gave 1.980 and 2.010 grams of the pure product. There was still left 0.060 grams of unchanged rubber in the decanted benzine solution. This rubber can be precipitated from its solution by the aid of acetone.

An experiment was now made to see whether or not the benzine, that was used in the experiment, did not also yield formolite when subjected to the same reaction. This was proven to be correct. One hundred cubic centimeters of benzine were treated in the same manner as the rubber solution described above. 0.182 gram of ocher yellow formolite was obtained, which must be deducted from the yield of formolite secured from the rubber solution. It may therefore be taken as a fairly exact approximation that one gram or one part of rubber will yield two grams or two parts of formolite.

After drying rubber formolite is seen to be a light ocher yellow powder, which is sifted as velvet and which is insoluble in aqueous solvents. In carbon disulphide it swells up strongly, and even to a greater degree in pyridine. The pyridine turns it a brownish red. It does not melt on heating, but carbonizes when heated strong enough to produce decomposition.

Bromine Addition Products of Rubber

An investigation was now made to determine how the ability of rubber to absorb bromine was changed by its conversion into formolite. 0.505 gram of crude formolite, equivalent to 0.4747 gram of pure formolite which is again equivalent to 0.217 gram of crude rubber was allowed to swell up in 50 cubic centimeters of carbon tetrachloride and then two grams of bromine, dissolved in 50 cubic centimeters of carbon tetrachloride, were added. The mixture was allowed to remain standing for a period of 24 hours and during that time it was frequently shaken. At the end of the 24 hours a dark brown pulver settled out which from its very appearance indicated that it contained bromine, there thus having taken place an absorption of bromine by the rubber formolite. (Rubber formolite is only a little heavier than water, and for that reason it floats on the surface of carbon tetrachloride.)

The liquor, still containing bromine, supernatant over the precipitated mass was poured off carefully and the solid matter was washed several times with acetone and then dried at a temperature of 80 degrees C. The above 0.505 gram of crude rubber formolite gave 0.570 gram of yellowish brown bromide which corresponds to a bromine absorption of 12.6 per cent. Based on the original rubber this means one atom of bromine for every molecule of $C_{20}H_{32}$. Inasmuch as the decomposition product obtained from para rubber by the action of sulphuric acid will absorb approximately 37 per cent of bromine, the formula of the compound is apparently $C_{20}H_{30}Br_2$.

*Chemiker Zeitung, 1923, page 513.

Popularity of Rubber Heels

Fully 60 out of every 100 pairs of shoes worn by men are equipped with rubber heels. But before the heel is attached to the shoe they are given severe tests by the manufacturer. Sometimes letter carriers are asked to wear shoes with rubber heels and soles as part of the testing program. One year the Cleveland police acted as testers. On another occasion four men were employed to work in four eight hour shifts. The task assigned each man was to walk for eight hours, at the end of which period the shoes were taken off and turned over to the next man coming on. These shoes were worn continuously for 1,000 miles of walking, and were said to be in good condition. Since the laboratory test fails to register the abrasive conditions met in actual walking, manufacturers of rubber heels are continuously employing men to test their product. Not so long ago Mr. Weston, the veteran walker, hiked across the Continent, aided of course by a well known make of rubber heels. As a result approximately 30,000,000 men are wearing rubber heels today, whereas 10 years ago the rubber heel was a novelty. The reason that rubber heels are popular today is that they are and were widely advertised.

More than 14,000,000 pounds of rubber is consumed each year in the manufacturing of rubber heels, it is stated.

Tire Dealer Airs His Views on Tire Distribution to the Editor

LETTERS

From THE RUBBER AGE Readers

Mr. Elberson Gives His Further Ideas on the Banbury Mixer

Insulating Tape

Comments on Tire Distribution

Editor, THE RUBBER AGE:

The writer has been interviewed various times in regard to the proper method of distributing tires. The various manufacturers hope to cure all the diseases which have been prevalent in the Summer months, in regard to tire distribution. The worst feature of the tire industry as seen from the dealers', standpoint, is that a great many of the various and so-called standard manufacturers of tires claim the right to sell all commercial accounts. If a man has two or three cars, they classify him as a commercial account, solicit him, and give him the same price, (or 5 per cent usually being the difference of discounts), as they give to the legitimate dealers who carry a stock on hand. We carry a stock, rougly speaking, of between thirty and thirty-five thousand dollars, and it is easy to figure that no one can run a business of any kind with only 5 per cent profit, as the overhead is a great deal larger than that.

Another thing, in the Fall of the year, the manufacturer deems it his sole right to talk of higher prices and goes deeply into detail regarding the advance in the cost of material, which he usually does for the benefit of enthusing the dealer and getting him to place orders. Then he, as soon as the season opens, does something he does not do in the Fall or Winter. Seemingly, he is afraid to advertise the fact that tires will advance in the Winter, but if a few of the factories get a little overstocked, instead of helping the dealer, he immediately will almost get out a special edition to announce the fact that prices have declined or will within a few days, which demoralizes the trade. This has been "pulled" three straight years.

The manufacturers are, seemingly, so hungry for the tire business that today, the dealer does not compete with other dealers, but he goes out and competes against the factory, not against retail dealers, as he is competing with each and every large and so-called standard factory in the land today.

The fact is, unless the practice is soon abolished by the so-called standard factories, of cutting prices in mid-season, there will soon be no dealers to sell to: then the only reason they claim for doing this is to get rid of the "gyp" manufacturers. We are sorry to state that the large and so-called manufacturers of today are placing on the market a second grade and some a third grade of tires, which are worse than some they style "the gyp manufacturers," and some, from my standpoint, as I see it, of the so-called standard manufacturers are the worst "gypers" we have in the United States today, none excepted.

If a man cannot make money in one line of handling tires and give service, why should he continue to invest his money in this business? Again, if there is no money in the tire business and the retail store must continue to compete and suffer loss against the various manufacturers, when they go out and solicit every account that is in the least satisfactory, can the manufacturer expect to have any dealers? How long do the manufacturers think the dealers will continue to buy and stock their merchandise? The only solution for the last question is that unless the manufacturers discontinue their crude methods of doing business, they will have no dealers at all.

Other businesses have been straightened up and gotten on their feet since the War, and the tire business could be put on its feet and the profit left for the dealers, if the manufacturers of tires would do as manufacturers of other lines do. Let the dealer distribute and sell the merchandise, instead of running a special edition to notify the public what the dealer must charge for goods that he has paid for. Then he goes out in the meantime and gives long discounts which take all of the profit away from the dealer. There is no other business that handles merchandise in such a crude manner. There is positively no other line of business that would hope to get on its feet and have dealers buy and stock their merchandise, as tire manufacturers do.

CITIZENS AUTO SUPPLY CO., Inc.

Indianapolis, Ind., Aug. 1, 1923.

More Concerning the Banbury-Mixer

Editor, THE RUBBER AGE:

I have read Mr. Banbury's letter and also the remarks in July 25th issue of THE RUBBER AGE concerning Birmingham-Banbury Mixers.

What I want to convey in my artic'e is that washing, grinding and mixing (also refining) has been done to some extent, and for a long period in enclosed machines. For mixing, the principle was first applied on wet batches (dough), and a little later a heavier apparatus for batching soft devulcanized scrap, and hose belting and packing batches. The enclosed refiner is a large forcing machine, having a water cooled screw, and if when operating, the gum has a tendency to scorch it is run slower and a coarser screen used.

Mr. Banbury suggests that "the size of the batches and the speed be reduced if stock burns" but this lowers the output (one of the machines best assets) and concerns having them expect large output. As for "cooling water" millrooms usually take their supply from a creek or pond, as artesian or spring water is not often available. I agree with Mr. Banbury that "it is not impossible to mix sensitive stocks by running slow and in small batches," also of course very cold water is desirable, if you can find it in a millroom during the warm months. "Material can be mixed on a Banbury machine at as low a temperature as on a roll mill," this seems to be so for medium and lower quality mixings, and probably for higher grades if the rubber is broken down very thoroughly so as to avoid grinding heat when mixing.

To get the most out of expensive enclosed mixing machines, when on high grade work, such as tire tread, side wall, cover, etc., the rubber is ground very soft in advance (some object to soft grinding, as while it makes nice mixing and calendering, the vulcanizing is never quite as tough), or another way is to grind the usual time, add the fillers, and leave the sulphur and accelerators to be put in on the sheeting-out mill, as this takes only two or three minutes.

B. W. ELBERSON

New York, July 27, 1923.

Manufacture of Insulating Tape

Editor, THE RUBBER AGE:

I am interested in the manufacture in general of rubber articles in this country (Mexico) where I have a factory turning out a variety of them.

At present I am deeply interested in the manufacture of insulating tape and would like to compare the processess that I have in use with those pursued by the manufacturers in the United States.

I am a subscriber of your publication and as such desire that you kindly furnish me with any information you may possess that may lead me to reach the aim in question.

It has occurred to me that you are in a position to assist me with the latest formulae and processes now in use, but should you not be able to comply with my request will thank you to put me in touch with the concern or concerns with whom I can obtain the information herein mentioned, and for which courtesy I beg to thank you in advance.

(Name on Request)

Mexico, D. F., Sept. 5, 1923.

Comments on Balloon Tires

Winter Calls Attention to Defects in Present Type Tires — Good and Bad Points of Balloon Tires

By **Arthur E. Friswell**

I HAVE followed with interest the recent presentations and discussions of this subject. In everything I have written regarding the pneumatic tire for many years in this country and in England I have advocated maximum pneumatic cushioning and deprecated any design which was a departure from it.

My article in THE RUBBER AGE of July 10th, 1922, was a most complete exposition of my views based upon long experience. In the two ply construction, secured by the Dickinson process, I am convinced that the ideal of maximum pneumatic cushioning is attained without the necessity of such a radical, expensive departure from type as the adoption of the "balloon' tire would entail.

In all the discussion of the "balloon" tire, I have failed to find any reference to the real reason for the objectionable high pressure and consequent rigidity of present type tires, and to the real reason for the anomaly of a thick rigid wall way beyond the tensile strength *per se* required.

These reasons were fully discussed in the article referred to and I respectfully suggest that a re-reading of it now that the "balloon" tire is occupying attention will be found to bear directly upon the discussion.

Defects of Present Carcass

The inherent defects of structure of the carcass of present type tires are responsible for the high pressure and rigidity, defeating enjoyment of full pneumatic cushioning and it is these defects which now require greater attention than the volume of compressed air. Briefly, the defects are distortion of cords in the textile structure, cords out of alignment, with uneven tension, imperfect so-called rubber impregnation (really insulation) and consequent chafing one against the other.

With these defects eliminated, as the Dickson process does eliminate them, the comfortable cushioning aimed for in the "balloon" tire is obtained with no problems of expensive redesigning by either automotive engineers or tire manufacturers but on the contrary at decidedly reduced cost without running into problems of service and durability about which there are such differences of opinion.

It has been demonstrated by laboratory actual road tests that the size 34 x 4½ made by the Dickinson process affords the cushioning and factor of strength of the present type 36 x 6. This improved construction affords the very flexibility of wall which the balloon tire is intended to give, reducing frictional heat, permitting lower pressure and freer deflection.

Is there in present type tires a sufficient volume of compressed air cushioning?

In my opinion—yes! if it can be more nearly instantaneously reached, which is exactly what the Dickinson process permits with no danger of breakdown of carcass from any of the structural defects mentioned.

Does the "balloon" tire reduce these defects? In one direction, yes! by thinning the walls. In other directions, No! but on the contrary accentuates the distortion of threads from correct angular alignment. The increased puckering or filling in of threads at the beads with tires of greatly increased cross section, and reduced standing diameter must sharpen the departure from the correct angle at these points, must increase the interference of thread with thread near these points, and the vulnerability of present type tires at and near these points is one of the reasons for recommended high pressure.

I have not seen it claimed by the proponents of the "balloon" tire that it will outwear the present type nor do I see how such claims could be consistently made. Cushioning is the main objective and a very worthy one; such other virtues as are claimed for the "balloon" appear to be subsidiary or incidental, and it is questionable whether the decided admitted disadvantages do not cutweigh them. No doubt the braking action is improved by the presentation of a greater area of road contact. This may be rightly claimed for present type tires also, if greater deflection can be permitted; on the other hand gasoline consumption surely increases as suction between tire and road increases. Damage to tires from wheels out of alignment is much more serious with tires of large than of small section, dust-raising, mud splashing and puncture liability must also be considered. Quite aside from the merits or demerits of the "balloon" tire, if the discussion results in more sensible simplified standardized sizes so that tires actually measure at some points what their markings represent, some good will have resulted.

Upsetting present rim standards is no light undertaking. I am convinced from past experience with the original Dunlop straight side tire that a width of rim of less than 50 per cent cross section of tire will result in tires breaking down from lack of base sectional resistance to side thrust, 66 per cent has proved to be required for all round service. Side swaying means rim chafing and cutting. There seems to be a difference of opinion as to what it may mean in the holding of the ear itself against side thrust. I consider the notes of caution already voiced against premature raising of public expectancy for the sudden adoption of the "balloon" tire to have been well sounded. Tests so far as presented have not been sufficiently extensive to bring out all the pros and cons, and in conclusion it seems to me much more sensible to root out completely structural defects than to adopt anything which, retaining them even in part, can be regarded as but dubiously palliative.

Kadox—New Zinc Oxide

Kadox Zinc Oxides, manufactured by the N. J. Zinc Company, are the result of an effort to produce a product of extremely fine particle size. The particles are so small that they are just within the limits of resolution of the highest powered microscope. Translated into ordinary dimensions, the diameter of an individual particle is approximately one two-hundred and fifty thousandth of an inch.

Rubber technology at present knows no commercially obtainable pigment or reinforcing agent of a finer state of subdivision than represented by this new product, according to the manufacturers.

In addition to retaining the recognized advantages of the standard zinc oxides in rubber compounds, there is added in Kadox a largely increased surface, which has resulted in higher tensile strengths, greater resistance to abrasion and a marked accelerating effect in vulcanization.

Kadox is offered in three brands: Black Label, Blue Label and Red Label.

Effect of Mark Depreciation on German Tire Prices

What the mark depreciation means in the German tire business may be visualized from the changes which have occured in retail tire prices during the past three months. In April, prices were increased 50%, in May 80%, in June 400%, and in July up to July 9, 500%, due to the depreciation of currency, higher wages, increased costs of raw material and an unprecedented domestic demand. Orders given take from six to eight weeks to fill. Dealers prefer to have stock on hand rather than money.

BOOK REVIEWS

MANUAL OF RUBBER PLANTING COMPANIES; Compiled by Zorn and Leigh-Hunt, London; 104 pages; Issued August, 1923.

A manual containing an alphabetical list of rubber planting companies, located in Ceylon, Java, Malaya, Selangor and Sumatra, has just been issued by Zorn, Leigh-Hunt, London. Names of directors, issued capital, other products, par capitalization a planted acre, market capitalization, standard production and exportable allowance at 60 per cent are also stated. Another feature of the manual is the compilation of crop production, figured in pounds, dating back to 1918; the all-in-cost, the profit per year, the dividend record from 1918, as well as the working capital. The manual, in short, is a handy reference for the crude rubber broker as well as the manufacturer who is desirous of obtaining first hand information on plantation profits.

Accompaning the manual is a statement that sets forth the principal points likely to affect the future price of rubber. Under the "cons" is listed the longer life of tires, as well as areas of young rubber trees still to come into tapping. Under the "pros" is listed the increasing use of motor vehicles all over the world; the potential demand for rubber from Europe, as well as new uses of latex.

It is estimated, according to the statement, that the United States will import 290,000 tons of crude rubber in 1923, against 120,000 tons for the rest of the world. Up and until July the United States has taken 193,000 tons, but it is assumed that American imports for the July-December period may drop to 97,000 tons, or only one-half of the tonnage for the January-June period. The statement points out that Restriction has not led to any wild jump in the price of rubber, and that the stimulation of consumption by a moderate price for the commodity has not been prevented.

RUBBER GOODS IN AUSTRIA. Monograph by A. M. Walker, Rubber Div., Dept. of Commerce.

The Austrian rubber market will become more important when stable economic conditions again prevail. This is especially true of Vienna. The Anglo-Austrian bank has been converted into a British institution under the control of the Bank of England. The Osterreichische Laender Bank has been taken over by French interests with offices in Paris. With French and English institutions directing the financial affairs of Austria it is intimated in this monograph that Austria will soon become economically sound. The most popular pneumatic tires on the market there are Michelin, French Goodrich, Continental, Austrian-made tires, four American makes and Pirelli, ranging approximately in the order named. Tire dealers there are experiencing a marked increase in demand for tires, this being especially true for the first quarter of 1923. The use of motor trucks and motor cycles affords a good market for solid trucks and motor cycle tires.

A SYMBOL OF SAFETY by Harry Chase Brearley. Published by Doubleday, Page & Co., 290 pages. Illustrated.

Woven about rational man is the story of progress, the history of science—achievement. From primitive times until today man has progressed, and at present he is ensconed in a world of machinery and mechanical devices. *The Symbol of Safety* by Harry Chase Brearley has to do with humanity's carelessness, its plunging forward into the uncertainties of the future, and the steady progress of an organization whose protective influences have done much toward making the office, factory and public carriers safer for man.

This valume relates the story of the foundation of the Chicago Underwriter's Association, which was founded in 1893 by William H. Merrill. It also comments upon the value of the fireproof building as well as on the railroad's block system. On pages 104-107 the author discusses the subject of rubber under the heading of "Rubber, or What?"

"Take, for example," he writes, "the tests of insulation on that popular size of rubber-covered wire known as Number Fourteen. Is your rubber wall at least three sixty-fourths of an inch in thickness? Has your outer covering of cotton braid the proper thickness? Is it of the proper workmanship and is its weave sufficiently close? Has it received proper saturation? What is the quality of rubber used in your insulation? How about the chemical tests of your rubber? Even after such questions as those cited have been satisfactorily answered and the label has been awarded, similar examinations and tests are repeated frequently on samples taken at the factory by the Label Service Department inspectors, on samples purchased from stock offered for sale, and on installation samples secured from buildings throughout the United States and Canada.

"Taken all in all, the Laboratories influence has been steadily directed not only toward the improvement of materials, but, what is at least as important, toward the constant, systematic and efficient maintenance of standards of quality by means of adequate and persistent testing."

The volume is written in a fluent style, is well illustrated, and contains chapters dealing with the following topics: Fighting Fires That Are Not Prevented; Building To Last, Not To Burn; Safeguarding The Universal Servant; The Study of Chemical Problems; Making Burglary More Difficult; Protecting Life and Limb; The Safety of Cars and Their Passengers, et cetera. All these subjects are woven into the Symbol of Safety.

Report of Inventory—Production—Domestic Shipments of Pneumatic Casings—Inner Tubes—Solid Tires

January, 1922 to July, 1923

"Production" and Shipment" figures cover the entire month for which each report is made. "Inventory" is reported as of the last day of each month.
"Inventory" includes tires and tubes constituting domestic stock in factory and in transit to, or at, warehouses, branches (if any), or in possession of dealers on consignment basis, and as a total represents all tires and tubes still owned by manufacturers as a domestic stock.
"Shipments" includes only stock forwarded to a *purchaser* and does not include stock forwarded to a warehouse, branch, or on a consignment basis, or abroad.

(Compiled by The Rubber Association of America, Inc.)

	PNEUMATIC CASINGS				INNER TUBES				SOLID TIRES			
MONTH	No. Mfrs. Reporting	Inventory	Production	Shipments	No. Mfrs. Reporting	Inventory	Production	Shipments	No. Mfrs. Reporting	Inventory	Production	Shipments
January, 1922	66	4,174,216	2,055,134	1,596,806	66	5,246,647	2,343,393	1,889,724	11	181,769	40,224	33,294
February, 1922	66	4,691,329	2,084,308	1,562,365	65	6,141,956	2,596,774	1,702,583	11	183,448	39,492	36,805
March, 1922	63	5,183,286	2,645,790	2,073,963	63	6,991,118	3,017,511	2,090,737	11	182,197	49,433	48,350
April, 1922	65	5,464,336	2,401,187	2,086,651	65	7,230,096	2,650,573	2,329,343	11	173,748	46,664	52,309
May, 1922	65	5,523,095	2,721,503	2,639,273	65	7,189,552	2,970,696	2,938,947	11	170,904	57,640	60,711
June, 1922	64	5,042,147	2,838,890	3,133,260	64	6,186,534	3,130,629	3,973,679	11	169,808	66,089	63,408
July, 1922	63	4,834,106	2,476,636	2,695,095	63	5,675,839	3,068,199	3,630,744	11	176,375	71,505	60,425
August, 1922	63	4,629,392	2,905,209	3,029,823	63	5,207,228	3,808,224	4,220,055	11	189,698	84,313	69,435
September, 1922	64	4,612,037	3,504,744	2,502,106	64	5,164,757	3,501,442	3,558,971	11	200,016	82,767	66,797
October, 1922	64	4,682,958	2,674,662	2,588,770	64	5,488,033	3,787,758	3,420,680	11	213,942	85,480	71,275
November, 1922	62	4,964,976	2,733,134	2,379,708	61	6,210,053	3,850,908	3,075,023	11	234,684	85,775	61,466
December, 1922	59	4,599,208	2,656,942	2,934,079	59	5,732,125	3,411,074	3,825,949	10	244,061	77,221	64,570
January, 1923	62	4,695,916	3,127,270	2,994,297	62	5,838,310	3,951,885	3,748,651	11	262,462	83,383	60,611
February, 1923	60	5,224,387	3,217,987	2,588,639	60	6,771,958	4,039,202	3,001,697	11	270,191	75,457	63,394
March, 1923	58	5,670,601	3,865,726	3,322,637	57	7,740,945	4,875,414	3,828,315	11	265,843	79,788	77,144
April, 1923	56	6,088,272	3,539,326	2,976,160	55	8,394,184	4,259,558	3,535,635	11	260,631	71,468	72,609
May, 1923	57	6,906,594	3,659,986	2,757,764	57	9,292,223	4,317,537	3,414,115	10	268,323	77,288	67,147
June, 1923	55	7,040,600	2,956,943	2,502,185	54	8924,326	3,590,011	3,581,060	10	283,425	72,445	52,126
July, 1923	54	6,471,124	1,992,989	2,534,425	52	7,396,444	2,625,118	3,942,247	10	263,891	42,345	45,219

TECHNICAL ABSTRACTS

Mechanical — Chemical — Physical

Reaction of Accelerators During Vulcanization*

The purpose of this paper is to study the subject of vulcanization, concentrating, however, upon the reactions of dithiocarbonates, thiuramdisulfides and hydrogen sulphide. Hydron sulphide is formed during vulcanization by the action of sulphur on some constituent of the rubber other than hydrocarbon, and the reaction is accelerated by heat. The metallic dithiocarbamates decompose and curing is retarded or stopped. Metallic oxides react with dithiocarbamates at ordinary temperatures, forming metallic oxides. Metallic oxides react with hydrogen sulfide, forming sulfides and sulhydrates, thus protecting dithiocarbamates from decomposition. The intervention of hydrogen sulfide prevents the dithiocarbamic acid from shifting from one metal to another. Metallic sulhydrates react with phenyl mustard oil and tetramethylthiuram disulfide to form metallic dithiocarbamates. As yet no evidence has been presented contrary to the theory that metallic dithiocarbamates are true accelerators, activating sulphur by the formation of polysulfides whose super sulphur is capable of vulcanization at a low temperature.

The acetone extract of pale crepe was placed in a test tube with sulphur under a piece of lead acetate paper held by the stopper. The paper blackened in from 5 to 8 days at room temperature or in 30 to 45 min. in a benzene bath at 80 degrees Centigrade. A mixture of 100 parts rubber and 10 parts sulphur was milled and portions placed in a closed desiccator under lead acetate paper. The paper darkened in from 2 to 4 weeks at room temperature. The same mix placed under test paper in the bottom of a beaker showed the black color in 2 hours on the steam bath or in less than 1 hour in an oven at 115 degrees Centigrade. Room was free of hydrogen sulphide shown by test papers.

Explanation is as follows: Hydrogen sulphide precipitates zinc sulphide from solutions of zinc dithiocarbamates, and thereby decomposes the accelerator. This action is the same as that of hydrogen sulphide on zinc acetate or zinc salts of inorganic acids. In high temperatures cures without zinc oxide an increment of curing-power is obtained from zinc dithiocarbamates prior to their decomposition by hydrogen sulphide. Later the acceleration is produced by the combined action of the decomposition of products which consist of amine and carbon disulphide. The cure therefore proceeds the same as if the amine salt of the dithiocarbamic acid had originally been compounded as such, with the exception that more carbon disulphide is now present.

Substitutes for Zinc Oxide

Zinc dithiocarbamate is sometimes considered as a substitute for zinc oxide when the following stocks are prepared: Rubber, sulphur, zinc salt and thiuram. Tetramethylthiuram disulphide protects zinc dimethyldithiocarbamate from decomposition, and therefore is considered to be a substitute for zinc oxide. It also gives the effect of freeing amine on the zinc salt.

In concluding the authors say that the idea of continual decomposition and re-formation of metallic dithiocarbamates during vulcanization at once suggests a possibility of the shifting from one metallic salt to that of another metal. Considering acceleration purely as a time factor, the relative action of the common oxides has been recorded through the time necessary to give an under, fair, OK, or over cure. It was found that lead dithiocarbamates do not air-cure except by the aid of calcium hydroxide or magnesia, and then but slowly. The lead salts are high-temperature accelerators and require the presence of litharge or zinc oxide. Litharge used as an aid to the dithiocarbamates of zinc, calcium or magnesium gives practically the same results as if the lead salt had been used.

Ammonia causes zinc dithiocarbamates of secondary amines to air-cure in absence of metallic oxides so that they function as rapidly as by the aid of calcium hydroxide or magnesia. The ammonia is believed to be held as an additional product to the zinc salts, and probably increases the basicity of the accelerator, thereby giving greater curing power. With thiuram disulphide the ammonia first forms the corresponding dithiocarbamate.

*By C. W. Bedford and Harold Gray. Abstracted from the Industrial and Engineering Chemistry, July, 1923.

The Solvent Properties of Acetone*

Acetone has excellent solvent properties, and it is used in many industries. Large quantities of acetone were used during the period of the World War in the manufacture of cordite and airplane "dope", exceeding the production of calcium acetate. As a result new methods for its manufacture were developed.

Acetone's complete miscibility with water makes it an excellent dehydrating agent and its miscibility with other solvents permits its use with them, increasing the individual efficiency of the other solvents. In some instances the addition of a small amount of acetone to two immiscible liquids produces a homogeneous solvent.

The grade of acetone obtained from calcium acetate is of good quality and homogenity. It is entirely volatile and does not impart an odor to the solute or extracted material. Acetone has a boiling point of 56.5 degrees C and a freezing point of -94.6 degrees C at normal pressure. Acetone is inflammable, but not to as great a degree as ethyle ether, carbon disulphide, benzene, toluene, gasoline, petroleum ether, and pentane. Acetone is a toxic substance, but its poteney is not as great as that of tetrachlorethane benzene or methanol. Its vapors are recovered easily by absorption in water, cresol and phenols, or wood-tar oil.

Acetone is not the best but is the most suitable solvent for acetylene, for cellulose esters (especially in connection with smokeless powder and cellulose acetate manufacture). It may be used for extracting wood pulp, to remove resins and other undesirable materials; as a solvent for preparing celluloid varnish; as a solvent for celluloid and wax, to prepare an elastic coating for linens, and in making waterproof adhesive from celluloid and the acetone extract from gum-lac.

Acetone is not a rubber solvent but dissolves only the rubber resins and oils which are found in the better grades of rubbers in amounts less than 5 per cent.

Crude Rubbers	Percentage Soluble at Boiling Point of Acetone
Balata Surian sheet	41.9
Balata Venezuela block	44.5
Benguellas	4.5
Caucho Ball	2.9
Caucho Central	2.8
Crepe, brown	2.8
Crepe, first latex	2.9
Gutta-percha	25.0
Guayule	21.0
Pontianac	95.8
Smoked sheet, primed ribbed	3.15
Up-river Fine	1.25
Upper Congo, red	5.8

*By R. F. Rember—Abstracted from the Industrial and Engineering Chemistry, July, 1923. Presented before the Division of Industrial and Engineering Chemistry at 64th meeting of the American Chemical Society, Pittsburg, Pa.

STATISTICS

IMPORT **PRODUCTION** **EXPORT**

TIRE SHORTAGE ?

Figures available on tire production, on average tire consumption and total car registration, indicate that there is an actual shortage in the number of tires which have been produced so far this year, according to the Miller Rubber Co.

There are 12,393,263 cars registered in the United States. An average tire consumption of 2.8 tires a year would call for 17,350,568 for a six months period. Figures available from automobile manufacturers show that 2,025,000 new cars were built in six months. These new cars require a minimum of 8,100,000 tires. Therefore 17,350,568, which is the average tire consumption for six months, plus the 8,100,000 required for new cars makes a total of 25,450,568 tires which should have been produced to meet this demand.

Fifty-five manufacturers, or 80% of the entire number in the country, reported to The Rubber Association of America that they manufactured 20,493,653 tires, according to Miller. 20% of that number amounts to 4,098,653. Assuming that companies which are not members of the Association produced that many tires, grand total of tires produced for the six months period would be 24,591,916. Thus there is shown an under production of 858,652 which is the difference between 25,450,568 and 24,591,916.

Assuming that 500,000 cars are not running and that they would have used 700,000 tires had they been in operation there is still an under production of 158,652.

Statistics Compiled from 1923 Questionnaire—Second Quarter

COVERING THE SECOND THREE MONTHS OF 1923

Number of rubber manufacturers reporting data 232
Number of crude rubber importers and dealers reporting data .. 40
Number of reclaimers (solely) reporting data 6

TOTAL DAILY AVERAGE NUMBER OF EMPLOYEES
(On Basis of Third Week of June, 1923)
163,902

	Reported by Mfrs. who also reclaim (25)	Reported by Reclaimers solely (6)	Total
No. of Pounds Reclaimed Rubber Produced from Raw and Cured Scrap ..	16,961,976	16,676,565	33,638,541
No. of Pounds Scrap Rubber (including Raw and Cured Scrap) Consumed in production of Reclaimed Rubber	24,995,591	21,859,009	46,540,412

Number of Pounds of Crude Rubber Consumed in the Manufacture of Rubber Products and Total Sales Value of Shipments of Manufactured Rubber Products

PRODUCT	Number of Pounds of Crude Rubber Used	Total Sales Value of Shipments of Manufactured Rubber Products
Tires and Tire Sundries:		
Automobile and motor truck pneumatic casings	104,611,372	$112,515,398
Automobile and motor truck pneumatic tubes .	23,913,971	17,214,249
Motorcycle tires (casings and tubes)	281,970	434,838
Bicycle tires (single tubes, casings and tubes)	753,420	1,301,075
All other pneumatic casings and tubes, not elsewhere specified	17,415	4,768
Solid tires for motor vehicles	14,998,567	8,237,594
All other solid tires	135,396	208,141
Tire sundries and repair materials	1,455,680	2,902,708
TOTAL—Tires and Tire Sundries	146,167,791	$142,818,771
Other Rubber Products:		
Mechanical rubber goods	10,762,572	24,280,619
Boots and shoes	9,665,831	29,522,711
Insulated wire and insulating compounds	2,010,079	9,066,147
Druggist sundries, medical and surgical rubber goods	1,585,429	3,884,369
Waterproof cloth, clothing, and rubber sheeting	1,875,442	6,674,264
Hard rubber goods	1,675,674	2,569,517
Heels and soles	3,467,227	3,957,866
Miscellaneous, not included in any of above items	3,210,248	5,133,484
TOTAL—Other Rubber Products	34,252,502	85,088,977
GRAND TOTAL—ALL PRODUCTS	180,420,293	$227,907,748

Inventory of Crude Rubber in the United States and Afloat for U. S. Ports, June 30, 1923

ON HAND	Long Tons: Plantation	Para	All Other	AFLOAT	Long Tons: Plantation	Para	All Other
Manufacturers	73,210	4,513	1,455	Manufacturers	12,798	86	...
Importers and Dealers ..	19,959	1,173	575	Importers and Dealers ..	14,684	277	145
Total	93,169	5,686	2,030	Total	27,482	363	145

GRAND TOTAL—ON HAND, 100,885 GRAND TOTAL—AFLOAT, 27,990

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Shipments of Rubber Manufacturers from the United States to Non-Contiguous Territories During the Month of July, 1923

		ALASKA		HWAII		PORTO RICO	
		Quantity	*Dollars*	*Quantity*	*Dollars*	*Quantity*	*Dollars*
Boots and Shoes	(*Pairs*)	7,200	19,146	5,877	8,060	77,316	55,595
Druggists' rubber sundries	(*Pounds*)	30	14	2,454	2,417	1,145	705
Automobile tires	(*Number*)	285	3,966	8,975	78,044	5,092	48,106
Other tires	(*Number*)	23	64	735	3,009	1,599	2,312
Belting, hose & Packing	(*Pounds*)	19,623	11,547	43,281	16,876	10,826	4,467
Other rubber manufacturers	(*Pounds*)	31,554	10,302	15,320	7,968	16,010	6,731
Coated and waterproofed goods	(*Pounds*)	7,263	4,774	6,287	3,048	1,934	1,802

Domestic Exports of Rubber Reclaimed, Scrap and Old, from the United States by Countries, for July, 1923

TO	Reclaimed: *Pounds*	Reclaimed: *Dollars*	Scrap and Old: *Pounds*	Scrap and Old: *Dollars*
Belgium	....	....	1,130	164
France	....	....	73,235	4,300
Germany	....	....	285,470	12,068
Netherlands	....	....	34,399	2,566
Spain	....	....	234,443	14,476
Sweden	11,281	1,403	....	....
England	16,353	1,698	3,349	913
Scotland	4,082	450	36,005	1,650
Canada				
Maritime Prov.	....	....	1,207	121
Quebec and Ontario	176,569	18,617	430,158	7,849
Panama	....	....	100	6
Japan	16,121	1,504	112,932	1,650
Total	224,406	23,672	1,212,428	45,763

MARKETS

Cottons and Fabrics

NEW YORK, Sept. 18, 1923

The gloomy estimate of the Department of Agriculture on the new crop resulted in the wildest cotton market that has been seen in many years. Prices advanced on the day of the report amid the greatest confusion and violent advances continued throughout the entire period we are reviewing. The shock that came after the holiday that one-third of the cotton spindleage of Japan had been destroyed only caused a momentary halt in the upswing and then the advance was resumed with a rush that brought prices to the 28 cent level. Over a period of only six weeks October futures advanced from 20¾ cents a pound to 28 cents a pound or nearly $35 a bale; increasing the value of the present crop about $400,000,000.

The Government's report estimated the condition of the cotton crop at 54.1 per cent forecasting a yield of only 10,788,000 bales, a decline of 13.1 per cent from the July 25 estimate and exceeding the 10 year average decline by more than 4 per cent. The trade seemed inclined to interpret the report as pointing to a cotton shortage. Previous reports on the new crop by the Government were equally sensational to this estimate of condition. The July 1 report startled the cotton world when it showed 38,287,000 acres actually planted, a record breaker that was 2,000,000 acres larger than private estimates. Then came another real sensation in the report on Aug. 1 estimating the condition as of July 25 at 67.2 per cent of normal which was the lowest estimate for that period in twenty years.

The next two weeks will remove all doubts as to the size of the crop and in a measure determine the price levels producers of fabric will feel are warranted by the conditions. The world carry-over of American cotton on Aug. 1 totaled, including linters, only 2,573,000, the smallest in many years and compares with 4,879,000 last year, 9,364,000 two years ago and an average of 6,826,000 in the past four years.

Cotton prices as of Sept. 18 on the New York Cotton Exchange were:

	Open	High	Low	Close	Prev. Day
Oct.	29.60	29.70	29.00	29.02	29.25
Dec.	29.30	29.33	28.61	28.61	28.92
Jan.	28.55	28.69	28.03	28.03	28.27
Mch.	28.45	28.60	28.00	28.00	28.25
May	28.27	28.45	27.85	27.85	28.05

Consumption Up 30,000 Bales in August

Cotton consumption increased 30,000 bales in August. The total amount for the month as reported by the Bureau of the Census was 491,604 bales of lint cotton as well as 47,998 bales of linters. During July there was consumed 461,575 bales of lint and 44,775 of linters. The consumption in August, however, was less than the amount in June when there was 542,166 lint bales used by the cotton mills.

The report was in line with general expectations as was the further decrease in the amount of cotton on hand. Stocks in consuming establishments and in public storage decreased to 1,985,875 bales on Aug. 31. The total on July 31 was 2,027,919 bales and at the end of June 2,577,954 bales. On Aug. 31 there was 806,671 bales in consuming establishments and 1,179,204 bales in public storage and at compresses. This compares with 938,689 bales on July 31 and 1,530,141 bales on Aug. 31 last year in public storage and at compresses and, 1,089,230 bales on July 31 and 1,024,874 on Aug. 31 last year in consuming establishments.

Cotton spindles active during August totaled 33,798,667 bales as compared with 34,237,887 in July this year and 32,491,857 in August 1922.

Exports during August totaled 244,415 bales, including 3,825 of linters, compared with 171,460 bales, including, 3,661 of linters during July and 272,808 bales, including 4,490 of linters in August last year. Imports during August were 3,420 bales, compared with 6,356 during July and 14,678 during August last year.

The following table shows the consumption of cotton exclusive of linters by months since the season of 1912-1913:

Cotton Consumed in the United States Each Month, in Thousands of Bales

Linters not Included

	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apl.	May	June	July	Season
1912-13	420	412	484	449	423	510	448	462	479	482	441	462	5472
1913-14	432	443	512	456	456	517	455	493	500	467	446	448	5577
1914-15	384	415	452	421	451	468	463	525	514	494	515	497	5597
1915-16	464	499	501	515	555	542	541	614	531	576	570	490	6398
1916-17	558	528	550	583	537	601	547	604	552	615	574	538	5789
1917-18	569	522	585	590	516	524	510	571	544	576	516	541	6566
1918-19	535	491	441	457	473	557	434	434	476	488	474	510	5768
1919-20	503	491	555	491	512	592	517	576	568	541	556	525	6425
1920-21	483	458	400	332	295	366	396	438	409	440	462	410	4888
1921-22	467	485	495	527	512	527	473	518	447	496	508	459	5912
1922-23	527	495	533	577	527	610	566	623	577	620	542	461	6664
1923-24	491	...	...	...	...	...	...	...	...	...	...	...	....

EXTRA STAPLE COTTON

The increased business at the fabric mills brought large orders for both spot and shipment cotton and the price situation was decidedly changed. Strict to good middling, 1¼ inch, which was bought as low as 33 cents a few weeks ago commanded 36 cents this week. Prices of extra staple cotton, strict middling in grade and color, f.o.b. New Bedford, are as follows:

1 1/8 inch, 32 to 33 cents
1 3/16 inch, 33 to 34 cents
1 1/4 inch, 34½ to 36 cents
1 5/16 inch, 36½ cents upward

Following the rise in American cotton all Egyptian cottons advanced sharply and prices show a gain of about 3 cents a pound. A preliminary forecast of Egyptian cotton production for 1923 issued by the International Institute of Agriculture in Rome puts the crop at 1,204,000 bales (478 pounds net) as compared with 1,015,000 last year. This indicates an increase of 18.6 per cent over the final estimate for 1922.

TIRE FABRICS

Tire and fabric manufacturers are beginning to prepare for production in the last quarter of the year. Sellers of tire fabrics report a much broader inquiry and sales have improved although the quantity of material involved has not been large. Some fabric mills are asking 57 cents for carded peeler cords about two cents above the price two weeks ago. The developments in the market mark a great change from the recent inactivity.

CORD FABRICS			
Combed Sakellarides	.68	@	.70
Combed Peeler lb.	.56	@	.61
Carded Peeler lb.	.55	@	.57
Combed Egyptian uppers lb.	.62	@	.64
Carded Egyptian uppers lb.	.58	@	.60
SQUARE WOVEN			
17¼-ounce Egyptian uppers. combed lb.	.57	@	.61
17¼-ounce Egyptian uppers. carded lb.	.56	@	.58
17¼-ounce Sakellarides, combed lb.	.65	@	.67
17¼-ounce Peeler, combed lb.	.54	@	.58
17¼-ounce Peeler, carded lb.	.51	@	.55
SHEETINGS			
40-inch 2.50-yard yd.	.17	@	.17½
40-inch 2.85-yard yd.	.15¼	@	—
40-inch 3.15-yard yd.	.15¼	@	.15½
40-inch 3.60-yard yd.	.13	@	—
40-inch 3.75-yard yd.	.12	@	—
40-inch 4.25-yard yd.	.11¼	@	—
DUCKS			
Belting lb.	.40	@	.42
Hose lb.	.40	@	.42
Enameling lb.	.50	@	.54
Shoe Ducks lb.	.52	@	.54
Single filling lb.	.22	@	.23½
Double filling lb.	.24	@	.25½
BURLAPS (Carload Lots)			
7½-ounce 40-inch	5.90	@	5.95
8 -ounce 40-inch	6.00	@	6.10
10 -ounce 40-inch	7.80	@	7.85
10½-ounce 40-inch	7.90	@	8.00
DRILLS			
37-inch 3.25-yard yd.	.14	@	.14¼
37-inch 2.75-yard yd.	.15½	@	.16
37-inch 3.00-yard yd.	.15	@	—
37-inch 3.50-yard yd.	.13	@	—
37-inch 3.95-yard yd.	.12	@	—
OSNABURGS			
30-inch 7-ounce	.16½	@	.17
40-inch 7-ounce	.17	@	.17½

Chemicals and Compounding Ingredients

THE INDUSTRIAL CHEMICAL MARKET—NEW YORK, Sept. 18, 1923—The Industrial Chemical market was decidedly more active during the last period and the volume of trading was very satisfactory to producers. Inquiries that led to good business became noticeable after the holidays and prices formed in response to the improved demand. A better feeling prevailed among buyers and sellers. Industrial conditions are now much better than at any time since the early months of the year and the upswing in general business which is under way will continue and reflect itself in the chemical market by strengthening the average market position. The demand for many items is now in excess of the usual seasonal volume and the indications are that there will be only chance opportunities to buy chemicals at lower prices at any time in the near future.

ACCELERATORS

Organic

Aldehyde ammonia, crystals	lb.	$ .90 @	.95
Aniline oil, drums	lb.	.16½ @	.17
Diphenylguanidine	lb.	1.20 @	—
Excellerex,	lb.	.45 @	.50
Formaldehyde-Aniline	lb.	.52½ @	—
Hexamethylene-tetramine	lb.	.95 @	1.00
Paraphenylenediamine	lb.	1.40 @	1.45
Super-Sulphur No. 1	lb.	.50 @	.60
Super-Sulphur No. 2	lb.	.25 @	.35
Tetramethyl—Thiuramdisulphide	lb.	6.00 @	—
Thiocarbanilide, kegs	lb.	.35 @	.40
Vulcocene	lb.	.35 @	—

Inorganic

Lead, sublimed blue	lb.	.09¼ @	—
Lead, white	lb.	.09¼ @	—
Litharge, domestic	lb.	10.40 @	14.00
Lime, Superfine	lb.	.02 @	.02½
Magnesia, calcined, light,	lb.	.23 @	.24
extra light	lb.	.45 @	—
heavy	lb.	.05 @	.06
Orange Mineral	lb.	.14 @	.15

COLORS

Blacks

Carbon Black	lb.	.13 @	.15
Micronex		.16 @	.18
Lamp Black	lb.	.12 @	.40
Bone "	lb.	.05½ @	.07½
Drop "	lb.	.07½ @	.10
Ivory "	lb.	.15 @	.45

Blues

Prussian	lb.	.50 @	.55
Ultramarine	lb.	.08 @	.35
Cobalt	lb.	.21 @	.26

Browns

Iron oxide	lb.	.04 @	.05½
Sienna, Italian,	lb.	.06 @	.14¼
Umber, Turkey,	lb.	.04 @	—
Vandyke, domestic	lb.	.03½ @	.04

Greens

Chrome, light	lb.	30 @	.32
medium	lb.	.32 @	.34
dark	lb.	.34 @	.42
commercial	lb.	.12 @	—

Reds

Antimony crimson, 15/17% F.S.	lb.	.36 @	.45
sulphur free	lb.	.39 @	.50
golden, 15/17% F.S.	lb.	.20 @	—
calcium and sulphur free	lb.	.40 @	—
red sulphuret 15/17% F.S.	lb.	.19½ @	—
Indian, English	lb.	.08 @	.12
Commercial		.08 @	.12
Para toner	cwt.	1.00 @	1.10
Red Oxide, reduced	lb.	.08 @	.12
pure	lb.	.12 @	.17
Toluidine toner	lb.	2.10 @	2.25
Venetian red	lb.	.03½ @	.06
Vermillion, quicksilver, English	lb.	1.20 @	—
domestic	lb.	.25 @	.30

Whites

Aibalith	lb.	.07 @	.07½
Aluminum bronze	lb.	.55 @	.60
Azolith	lb.	.07 @	.07½
Lithopone, domestic (factory)	lb.	.07 @	.07½
Zinc Oxide—American Process			
American Horse Head special	lb.	.08½ @	.09
XX red	lb.	.08 @	.08½
American Azo: ZZZ (lead free)	lb.	.08 @	.08½
ZZ (under 5 per cent leaded)	lb.	.07¼ @	.07¾
Z (8-10 per cent leaded)	lb.	.07¼ @	.07¾
Zinc Oxide—French Process			
White seal	lb.	.12 @	.12¼
Green seal	lb.	.10¾ @	.11¼
Red seal	lb.	.09¾ @	.10¼

Yellows

Chrome, light		.17½ @	.18
dark and medium	lb.	.17½ @	.18
Cadmium Sulphide	lb.	1.50 @	1.75
Ocher, French	lb.	.02 @	.03
domestic	lb.	.02½ @	.03

COMPOUNDING INGREDIENTS

Aluminum flake	ton	29.00 @	—
hydrate light	lb.	.18 @	.20
Ammonia carbonate,	lb.	.09 @	.10½
Barium carbonate,	ton	66.00 @	73.00
Barium Dust	lb.	.05 @	.06
Barytes southern off-color,	ton	15.00 @	20.00
Western, prime white	ton	28.00 @	—
Basofor	lb.	.04¾ @	—
Blanc fixe, dry f.o.b.works	lb.	.04 @	.04¼
Carrara filler	lb.	.01½ @	.02
Chalk, precipitated, extra light	lb.	.04¼ @	.05
heavy	lb.	.03¼ @	.04
Clay, China, domestic,	ton	15.00 @	16.50
Dixie	ton	22.00 @	32.00
Blue Ridge	ton	20.00 @	30.00
Fossil flour	ton	60.00 @	—
Glues, extra white	lb.	.30 @	.40
medium white	lb.	.20 @	.26
cabinet	lb.	.18 @	.30
cabinet low grade	lb.	.16 @	.19
common bone	lb.	.08½ @	.14
Graphite flake, bbls.	lb.	.06½ @	.12
amorphous	lb.	.05 @	—
Infusorial earth, powdered	ton	60.00 @	—
bolted	ton	65.00 @	—
Liquid latex	gal.	1.30 @	—
Mica, powdered	lb.	.15 @	—
Rotten Stone (powdered)	lb.	.02½ @	.04½
Soapstone, powdered	ton	12.00 @	15.00
Starch, powdered	cwt.	3.20 @	3.22
Talc, domestic	ton	15.00 @	18.00
French	ton	20.00 @	—
French, high grade	ton	40.00 @	—
Italian	ton	47.00 @	58.00
Terra Alba	cwt.	1.85 @	2.00
Tripoli, white	lb.	.02 @	.02½
Whiting, commercial	cwt.	1.00 @	1.25
English cliffstone	cwt.	1.50 @	2.50
gilder's bolted	cwt.	1.10 @	1.25
Paris white American	cwt.	1.25 @	1.50
Quaker	ton	13.00 @	15.00
Wood pulp XXX	ton	35.00 @	—
" " X	ton	25.00 @	—
Zinc Oxide—lead free	lb.	.08 @	—
5 per cent leaded		.07¼ @	.07¾
10 per cent lead sulphate	lb.	.07¼ @	.07¾
20 per cent lead sulphate	lb.	.07¼ @	.07¾
35 per cent lead sulphate	lb.	.07¼ @	.07¾

(Also see whites)

MINERAL RUBBER

Genasco (factory)	ton	50.00 @	52.00
Granulated M.R.	ton	36.00 @	47.00
Hard hydrocarbon	ton	31.00 @	42.00
Soft hydrocarbon	ton	30.00 @	40.00
Pioneer M.R.	ton	42.00 @	44.00
320/340 M. P. hydrocarbon (c. l. factory)	ton	45.00 @	50.00
300/310 M. P. hydrocarbon (c.l. factory)	ton	40.00 @	45.00
Synpro, granulated, M. R. (factory)	ton	55.00 @	70.00

SOFTENERS

Acids

Acetic, 28 per cent	cwt.	3.38 @	3.63
Creaylic, 97 p.c.	gal.	1.00 @	1.15
95 p.c.	gal.	.95 @	1.10
Muriatic, 20 degrees	cwt.	1.00 @	1.10
Nitric, 36 degrees	cwt.	4.50 @	5.00
Sulphuric, 60 degrees	ton	11.00 @	12.00
66 degrees	ton	15.00 @	16.00
Tartaric, crystals	lb.	.36 @	—

Alkalies

Caustic soda, 76%	cwt.	3.15 @	3.16½
Soda ash, 58%	cwt.	1.38 @	1.69

Oils

Castor, No. 3, bbls.	lb.	.13 @	—
Corn, crude, bbls.	lb.	.10¼ @	.10½
refined	lb.	.13 @	—
Chinawood, bbls	lb.	.22 @	.22½
Cottonseed,		.11 @	11.50
Glycerine,	lb.	.17 @	.17½
Linseed, domestic	gal.	.83 @	.90
Palm Niger	lb.	.06¾ @	.06⅞
Lagos	lb.	.07⅛ @	.07¼
Peanut,domestic,crude	lb.	.15 @	—
Pine, steam distilled	gal.	.67 @	.75
Rapeseed, refined	gal.	.76 @	.78
blown	gal.	1.00 @	1.05
Rosin, first rectified	gal.	.45 @	—
second rectified	gal.	.47 @	—
Tar, commercial	gal.	.31½ @	—
Soya Bean		.11½ @	.11¾
Petroleum, amber	lb.	.04½ @	—
dark amber	lb.	.03¼ @	—

Resins and Pitches

Cumar resin, hard	lb.	.09 @	.10
soft	lb.	.09 @	.10
Parra M.R.	lb.	.06 @	.07
Tar Retort	bbl.	11.00 @	—
kiln burned	bbl.	11.00 @	—
Pitch, Burgundy	lb.	.05 @	.06
coal tar	lb.	.01½ @	.02
pine tar	lb.	.03 @	—
Rosin, grade K	bbl.	5.90 @	—
Shellac, fine orange	lb.	.90 @	—

Solvents

Acetone, drums	lb.	.25 @	—
Alcohol, denatured, No. 1 bbls.	gal.	.43½ @	.45½
Benzol, tanks	gal.	.27 @	.32
Benzol, 90 per cent	gal.	.25 @	.30
pure	gal.	.30 @	.35
Carbon bisulphide,	lb.	.06½ @	.07
Tetrachloride	lb.	.09 @	.10½
Dimethylaniline	lb.	.41 @	.43
Motor gasoline, steel bbls.	gal.	.19½ @	—
Naptha, V. M. & P.	gal.	.18½ @	—
Toluene		.30 @	.38
Turpentine, spirits	gal.	.95 @	—
wood	gal.	.85 @	—

Waxes

Beeswax	lb.	.40 @	.42
Carnauba, No. 1	lb.	.42 @	.43
Ceresin, white	lb.	.10 @	.11
Bayberry	lb.	.25 @	.30
Phenol	lb.	.28 @	.30
Montan, crude	lb.	.05 @	.05½
Ozokerite, black	lb.	.23 @	.24
green	lb.	.27 @	.28
Paraffine	lb.	.02¾ @	.03
Sweet wax	lb.	.10 @	.12

SUBSTITUTES

Black	lb.	.09 @	.14
White	lb.	.10 @	.16
Brown	lb.	.10 @	.15
Brown factice	lb.	.09½ @	.13
White factice	lb.	.08½ @	.15

VULCANIZING INGREDIENTS

Black hyposulphite	lb.	.21 @	.22
Sulphur Chloride (drums)	lb.	.04 @	.06
Sulphur flour (bbls.)	cwt.	2.75 @	3.30
(bags)	cwt.	2.50 @	2.75
Commercial		1.35 @	1.70
Superfine		2.00 @	2.40
Bergenp't brand (bags)	cwt.	2.45 @	2.75
(bbls.)	cwt.	2.70 @	3.25

Chemicals

Carbon Black—There was good buying by the rubber manufacturers and this resulted in a better tone in the market. Spot goods brought 17 cents in New York. There is no scarcity of the material in the market at this time and the feeling is that the demand this fall will take care of all the new production that will come on the market.

Lithopone—Business in August was almost as good as in July when the demand for lithopone was at the best of the year. Consumption of this product has increased enormously the past several years and more rapidly this year than in any other year. It is expected that prices for the last quarter of the year will continue as they are now, 7 cents a pound for domestic in bags; 7 to 7¼, barrels car lots; 7¼ to 7½ cents less than car lots.

Litharge—There was more interest shown in this market than in the previous period and it is generally believed that the market is quickly coming back to normal. Prices were unchanged, casks being quoted at 10.40 cents a pound; 100 to 500 pound kegs, 14 cents; 500 to 2,000 pounds, 12.60 cents; 2,000 to 10,000 pounds, 12.09 cents.

Barytes—There was little change in the market, good business being done and the outlook being bright. Prices remain the same, the Missouri product being quoted at $28 per ton f.o.b. works and Southern off color at $15 to $20 per ton.

Zinc Oxide—Considerable improvement was shown in this market since Aug. 1. Tire manufacturers are again coming into the market and large business is looked for this fall. Prices hold steady with American process, commercially lead free, in bags, at 8 cents a pound; barrels, carlots, 8½ cents; less than carlots, 9 cents. All leaded oxides, 7¼ cents to 7¾ cents.

Blanc Fixe—A good business is being done in this material and the market was steady with prices unchanged. For dry, 4 to 4¼ cents a pound was quoted and pulp brought $50 to $55 a ton.

Orange Mineral—The demand for both domestic and imported was good and a good fall business is expected. Domestic material is quoted at 13.90 to 15 cents per pound; French, 17 cents; English, 15 cents.

Whiting—There was no particular change in the market. The demand was up to the season and prices continued firm. Commercial was quoted at $1.00 per hundred pounds; American paris white, $1.15; English cliffstone, $1.50.

Scrap Rubber

NEW YORK, Sept. 17, 1923

Demand in scrap has been fair during the past fortnight with no improvement or increase in prices shown. Further improvement however has been expected for some time by dealers and is looked for shortly. The crude rubber market had little effect on scrap and will continue so until it again reaches the 35 cent mark. The demand for reclaimed continues and should shortly be reflected in scrap prices. Prices at this date are:

Auto tire peelings	.01¼	@	.01½
Standard White auto ....ton	20.00	@	25.00
Mixed auto .....ton	16.00	@	18.00
Bicycle tires .....ton	14.00	@	16.00
Clean solid truck tires	.01¼	@	.01½
Boots and shoes	.03⅛	@	.03⅜
Arctics, trimmed	.02	@	.02¼
Arctics, untrimmed	.01⅛	@	.01⅝
Inner tubes, No. 1	.04¾	@	.05
Inner tubes, compounded	.03½	@	.03¾
Inner tubes, red	.03¾	@	.04
Battery jars, clean hard rubber	.02	@	.02½
Rubber Hose	.00⅞	@	.01
Red packing	.01	@	.01¼
White druggist sundries	.04	@	—

Reclaimed Rubber

NEW YORK, Sept. 17, 1923

Reclaimed has been in active demand the past two weeks with a fair interest displayed. Prices have changed but little, friction now being quoted at 22-23 cents with boots and shoes (washed) showing a fractional increase to 13¼-13½ cents. Greater activity is expected shortly. Prices are as follows:

Floating Tube	.15½	@	.15¾
Friction	.22	@	.23
Boots and Shoes (unwashed) ..	.10½	@	.11
Boots and Shoes (washed)	.13¼	@	.13½
Mechanical	.10	@	.11
Hose	.10	@	.11
Tires, truck	.08½	@	.09
Tires, auto, black	.09½	@	.09¾
Black (washed)	.11	@	.11¼
White	.13¼	@	.13½
Grey	.11	@	.11½

New Incorporations

DELAWARE

Gillico Tire & Rubber Co. $500,000. Principal office, Wilmington, Delaware. Agent, Colonial Charter Co., Wilmington, Delaware.

Andrews Armor Tire Co., Inc., to manufacture and distribute tire protectors. $100,000. Principal office, Wilmington, Delaware.

Argo Asbestos & Rubber Corp., to manufacture and sell packings, asbestos goods and textiles. Incorporators: W. Carskaden, L. A. Vezie, J. E. Alick—all of Pittsburg, Pa. Agent, Capital Trust Co. of Delaware.

NEW JERSEY

United Rubber Machinery Exchange. 2500 shares, no par value. Principal office, Newark, New Jersey. Representative, A. Calandra, Newark, N. J.

NEW YORK

Mount Kisco Rubber Co. $15,000. Principal office, Mount Kisco, Westchester County, New York. Incorporators: N. and H. B. and L. Potter. Attorneys, Ticknor & Ticknor, Mount Kisco.

Genesee Rubber Corporation, to deal in tires. Capital, 250 shares preferred stock par $100. and 750 shares of common stock. Principal office, Syracuse, New York. Incorporators: B. E. Shove, A. Lundberg, and H. W. Clasen.

Mallard Rubber Co., to manufacture and sell mechanical rubber goods. $200,000. Principal office, Cleveland, Ohio. Incorporators: J. H. Cox, A. M. Evans, R. S. Christian, F. Sanders, and W. T. Brown.

Bowler Tire Co., Inc., to manufacture tires. $5,000. Principal office, Amsterdam, New York. Incorporators: A. M. Bowler and H. D. Bowler—Amsterdam, New York.

Dreher Sales Inc., to manufacture tires and tubes. $10,000. Principal office, Buffalo, New York. Incorporators: H. W. Paprocki, F. H. Butchorn and H. B. Holland, 37 Wall street, New York City.

CAPITAL INCREASES

Dexter Rubber Mfg. Co., Goshen, to issue 1700 shares of preferred stock, $100 each; 4,400 common, no par value.

Crude Rubber

NEW YORK, Sept. 18, 1923

The chief points of interest in crude rubber during the past two weeks were the reduction in tire prices by Firestone and U. S., the Japan earthquake and the strike on the London docks—all of which had some slight effect on the market.

A slight depression followed the announcement of lower tire prices but it was only temporary. The earthquake resulted in a loss of communication and trading was very limited as a result. It was not known whether plantations in Sumatra and Malay had been damaged but as no reports have been received to that effect, no serious effects are expected. The strike of dockmen in London has resulted in a small accumulation of rubber there which is moving again.

As a whole however, the market has been easier in tone with some spot buying. Futures have evinced no interest, factory buyers being content to buy in a hand to mouth fashion. Some buying was reported recently in Singapore by several of the larger manufacturers.

Tire production has eased off but mechanicals are working at capacity. Garden hose has fallen off as expected. Poor weather has not had any good effect on tire sales nor has the constant price cuts during the past few months. Dealers are skeptical and refuse to carry large stocks.

Prices have eased off since our last quotations with first latex selling at 29⅛ for spot. The lower grades of plantations received some inquiries with the market remaining firm. Other grades were dull and unchanged.

Quotations at this date are as follows:

Plantations			
First Latex, spot	.29	@	.29⅛
Ribbed Smoked Sheets ...	.28½	@	.29
Sept.-Oct.	.28¾	@	.29
Oct.-Dec.	.29⅛	@	.29⅜
Jan.-March	.29	@	.30
Jan.-June	.30⅛	@	.30⅜
Amber Crepe No. 1, spot ..	.28	@	.28¼
Amber Crepe No. 2, spot ..	.27½	@	.27¾
Amber Crepe No. 3, spot ..	.27	@	.27¼
Light Clean Thin Brown Crepe	.27½	@	.27¾
Commercially Clean Thin Brown Crepe	.26½	@	.26¾
Specky Brown Crepe	.26¼	@	.26½
Roll Brown Crepe, spot ...	.26⅞	@	.27
Paras			
Madeira Fine	.28¾	@	.29
Acre Fine	.27¾	@	.28
Up-river Fine	.27¾	@	.28
Up-river Medium	.26½	@	.26¾
Up-river Caucho Ball (shipment)	.24¼	@	.24½
Up-river Coarse	.23⅞	@	.24
Islands Fine	.26¼	@	.26½
Islands Medium	.24½	@	.24¾
Islands Coarse	.14	@	.14⅛
Cameta	.14	@	.14⅛
Xingu Ball	.23¾	@	.23½
Tapajos Fine	.26¼	@	.26½
Tapajos Medium	.22⅞	@	.23
Pontianac			
Prime Pressed	.13	@	.14
Plantation	.07½	@	—
Bangermassin	.08	@	—
Siak Gutta Percha	.20¾	@	—
Prime Macassar	3.00	@	—
Balata			
Surinam Sheets	.80	@	.85
Columbia Block	.60	@	.65
Venezuela Block	.70	@	.75
Guayule, washed and dried ...	.28	@	—

Rubber Patents

SEPTEMBER 4, 1923

1,466,682 Supporter. Robert E. Uhl, Greenfield, Ohio, assignor to Pioneer Suspender Company, a Corporation of Pennsylvania.
1,466,765 Demountable Collapsible Rim. Leo Burdell Spencer and James Emerson Spencer, Akron, Ohio.
1,466,812 Demountable Wheel Rim. John Wentz, Perham, Minn., assignor of one-half to Michael J. Gans and one-fourth to P. F. Vogel, both of Perham, Minn.
1,466,891 Pneumatic Tire. Reuben B. Disbrow, Owatonna, Minn., assignor of one-half to L. P. Ordway, St. Paul, Minn.
1,466,942 Method of Manufacturing Tires. Karl D. Saulpaw, Calhoun, Tenn.
1,467,055 Automatic Alarm for Partially-Deflated Tires. Andre Jules Michelin, Paris, France.
1,467,113. Packing for Pistons. Theodore A. Meyers, Toledo, Ohio.
1,467,122 Machine for Installing and Removing Tires from Rims. James W. H. Snell, Detroit, Mich.
1,467,142 Collapsible Tire Core. Harold A. Denmire, Akron, Ohio, assignor of one-half to The General Tire and Rubber Company, Akron, Ohio, a Corporation of Ohio.
1,467,143 Fabric-Ring Stretching and Applying device. Harold A. Denmire, Akron, Ohio, assignor to The General Tire and Rubber Company, Akron, Ohio, a Corporation of Ohio.
1,467,172 Tire. Donald S. Kennedy, New York, N. Y.
1,467,197 Art of Vulcanizing Rubber. William Fraser Russell, Norwalk, Conn.,assignor to The Norwalk Tire & Rubber Company, Norwalk, Conn., a Corporation of Connecticut.
1,467,289 Method of Fabricating Tire Fabrics. George M. Eames, Bridgeport, Conn.

SEPT. 11, 1923

1,467,313 Tire Flap. John R. Gammeter, Akron, Ohio, assignor to The B. F. Goodrich Company, New York, N. Y., a Corporation of New York.
1,467,315 Collapsible Core. Frank H. Grove, Columbiana, Ohio.
1,467,317 Low-Pressure Alarm for Pneumatic Tires. William A. Harris, Greenville, S. C., assignor to Harris Accessory Company, Greenville, S. C., a Corporation of South Carolina.
1,467,410 Demountable-Rim Fastening. William Erastus Williams, Chicago, Ill.
1,467,411 Toy Balloon. Arthur P. Witten, Akron, Ohio.
1,467,438 Apparatus for the Manufacture of Hollow India-Rubber Balls. Alfred Lawton, Manchester, England.
1,467,440 Valve for Use in Connection with Pneumatic Tires Applicable for Other Suitable Purposes. James Lumb, Elland, England.
1,467,463 Pneumatic Swimming Belt and Method of Making Same. John M. Welch, Des Moines, Iowa.
1,467,484 Dust Cap for Tire Valves. Henry P. Kraft, Ridgewood, N. J.
1,467,547 Rubber Heel. Louis Kaplan, New York, N. Y.
1,467,557 Nonpuncturing Air Chamber. Henri Nicolardot, Boulogne-sur-Seins, France.
1,467,588 Wheel Rim. Sydney I. Prescott, New York, N. Y., and Francis J. Rummler, Lyndhurst, N. J.
1,467,665 Pneumatic Tire. Nathaniel G. Warth, Gallipolis, Ohio.
1,467,671 Device for Inflating Tires and the Like. Jacob W. Kaiser, Cleveland, Ohio.
1,467,761 Method of Vulcanizing Treads and Mold used in Such Method. William Martin Jones, Jr., Rochester, N. Y.
1,467,780 Tire Valve. Lincoln S. Downs, East Cleveland, and George Heckling, Cleveland, Ohio.
1,467,809 Tightening Device for Demountable Wheel Rims. John R. Oishei, Buffalo, N. Y., assignor to Tri-Continental Corporation, Buffalo, N. Y.
1,467,852 Demountable Rim. Marcellus C. Hall, West Marion, S. C.
1,467,875 Pneumatic Composite Heel. Jessie E. Price, Los Angeles, Calif.
1,467,881 Demountable Rim. Louis Rosebush and Fred J. Rosebush, Flint, Mich.
1,467,948 Tire Press. Morris A. Pearson, Erie, Pa., assignor to Allen Machine Company, Erie, Pa., a Corporation of Pennsylvania.
1,467,984 Employing Derivatives of the Condensation Products of Amines and Aldehydes in the Vulcanization of Rubber. Clayton Olin North, Tallmadge, Ohio.
1,467,986 Pneumatic Shock Absorber. Edward Van Der Pyl, Worcester, Mass., assignor to Aerobelle Company, a Corporation of Massachusetts.
1,467,987 Shock Absorber. Edward Van Der Pyl, Worcester, Mass., assignor to Aerobelle Company, a Corporation of Massachusetts.

Exhibits at Chem. Exposition

(Continued from Page 466)

and Dial Indicating Thermometers; TAG Industrial Thermometers; TAG Chemical Thermometers and Hydrometers; TAG Mono Duplex Recorder for Flue Gas Analysis and TAG Oil Testing Instruments many of which have been adopted as standard by the A.S.T.M., U. S. Government, American Petroleum Institute, etc. Booth 275, 276. In charge, G. R. Dickinson.

THE BRISTOL COMPANY, *Waterbury, Conn.*—The Bristol exhibit this year features automatic temperature control, with special reference to chemical and allied industries. Bristol Fuller Valves (motor operated) are shown arranged for six different applications, illustrating the adaptability of this valve and ease with which it can be transformed from one application to another.

All classes of Bristol Thermostats and Bristol Pyrometer Regulators for use with above valves are also shown. There are also Recording Pressure Gages, Liquid Level Gages, Thermometers, Psychrometers, Pyrometers, Voltmeters, Ammeters, Wattmeters and Tachometers, besides Mechanical and Electrical Time Recorders, and Electrical Long Distance Transmitting Recorders. Booth 83, 84. In charge of C. W. Williamson.

THE BROWN CO., *Philadelphia, Pa.*—Added to the standard line of Brown Indicating and Recording Pyrometers, Thermometers, Pressure Gages, and Tachometers, the following new instruments are of keen interest to chemical. Brown Hydrogen Ion Recorders for recording alkalinity and acidity, Oxygen Content Recorders, and Indicating and Recording Temperature Control, Signalling and Alarm Instruments are shown. All other standard Brown Instruments, such as; Radiation Pyrometers, Portable Potentiometers, etc., are shown. Booths 40-41.

The following represented the company: R. P. Brown, President; G. W. Keller, Sales Manager; J. P. Goheen, Secretary; R. B. McCafferty, Sales Engineer; W. S. Koop, Sales Engineer; W. R. Moore, Sales Engineer; E. M. Hertzler, Sales Engineer; F. G. Eisley, Sales Engineer; P. S. Sears, Sales Engineer; J. D. Andrews, New York District Manager; George Goodman, New York District Representative; George P. Beck, Boston District Representative; O. W. Stowe, Pyrometer Engineer; E. A. Keeler, Research Manager; and C. L. Simon, Technical Director of Advertising.

COOPER HEWITT ELECTRIC COMPANY, *Hoboken, N. J.*—The equipment includes the Uviare Test Cabinet, Uviare Laboratory Outfit, and the Lab Arc. These three lamps are sources of Ultra Violet Light for Industrial and Research Work in Photo Chemistry, Bacteriology and Phototherapy.

There are also exhibited two new types of Cooper Hewitt lamps for Industrial Illumination purposes, and Photographic work. Booth 202. In charge, M. B. Firelock, with the assistance of R. D. Mailey, L. J. Buttolph, W. J. Winninghoff and W. Walker, all of the Engineering Department; also members of the Sales Force.

AMERICAN SCHAEFFER & BUDENBERG CORP., *Brooklyn.*—Are displaying a complete line of "Instruments for the Promotion of Efficiency and Perfection of Products," comprising Indicating and Recording Gages, Indicating and Recording Thermometers, Temperature Regulators, Pop Safety and Relief Valves, Steam Traps, etc. Booth 65. In charge of H. V. Carlier, assisted by Messrs. F. Undeutsch and W. I. Stark.

AMERICAN HARD RUBBER CO., *N. Y. City.*—The exhibit of ACE Chemical Equipment suggests the many practical applications of hard rubber in the chemical industries. Corrosive proof pumps, pipe, tanks, fittings and utensils used for handling corrosive acids are shown.

The unique feature of the exhibit is a tall column of an eight inch hard rubber pipe surmounted by a glass globe in which the discharge of a hard rubber pump is sprayed in color. Practical arrangements of standard ACE Hard Rubber Pipe and Fittings in connection with a hard rubber centrifugal pump in actual operation, indicate their use in the chemical industry. The latest type of single and double acting pumps arranged for steam and belt drive have a place.

Another important feature will be a display of hard rubber tanks and ACE hard rubber linings for steel tanks and pipe.

Special pieces of general interest such as radio panels and ACE hard rubber combs are included in the exhibit. Booth 2. In charge, C. R. Aekerman and D. Wilkins.

NEW JERSEY ZINC CO., *N. Y. City.*—The exhibit of this company is essentially the same as last year, with the addition of products heretofore sold by the Durex Chemical Corporation. All products will be displayed, but the main exhibits will be that of the use of Zinc Oxide in rubber. Graphic charts are also shown of the various uses of The New Jersey Zinc Company products, among which are: Barium Carbonate; Blanc Fixe, dry and paste; Cadmium Yellow; Leaded Zinc Oxides; Lithopone; Muriatic Acid; Ochre; Sodium Sulphide, crystal and solid; Sulphuric Acid; Zinc Chloride; Zinc Dust; Zinc Oxides; Zinc Sulphide. Booth 8-9.

W. Homer Hendricks, General Sales Engineer, was in charge of the personnel at the exhibit, assisted by Messrs. E. W. Boughton, B. R. Silver, E. L. Carey and L. H. Trott. The Sales Department was represented at all times by F. C. Fuller, Manager of Eastern Sales, and Messrs. H. Hedden, G. B. Horsful, C. A. Stedman, J. P. Dunphy, W. J. Keuhn and F. W. Jones. C. F. Beatty, Advertising Manager also was on hand.

J. P. DEVINE CO., *Buffalo, N. Y.*—Are not exhibiting any apparatus, but have a large number of photographs of actual installations of apparatus. J. P. Devine, President of the Company, L. W. Graves, Sales Manager, and H. E. Dimmick from the Buffalo office and A. M. Howes of the New York office were in attendance. Booth 61, 62.